IDG .net

SEEKING E-QUALITY

Want more Web customers? Make sure you're giving them a quality shopping experience. Page 46

INTERNET TAXES

Rep. Christopher Cox (R-Calif.) says NO: bad for economy. Dan Gillmor says YES: be fair to other businesses. Page 34

START-UP STARSTRUCK?

Yearning to jump ship for a hot high-tech start-up? Expect awful hours, low pay and no family life. Ready yet? Page 44

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KATHERINE LAMBERT

SEC INVESTIGATORS Paul Berger (left) and Greg Faragasso were part of a SWAT team that swooped in to stop alleged accounting fraud at Livent Inc., a producer of Broadway shows

COOKING THE BOOKS

THE CHIEF FINANCIAL OFFICER walks in and asks you to "roll back the computer clock" on those figures to make last quarter's financial report look better. Do you do it? In several recent cases, the SEC has investigated IT managers who pulled tricks like that as part of conspiracies to commit accounting fraud or falsify records, reports Kim S. Nash. For example, IT professionals at one firm tinkered with accounting systems to produce bogus invoices and cover up previous scams. Be forewarned: The SEC says IT managers will be held accountable for computer-enabled fraud.

Story is on page 20.

TWO BIG FAILURES CITE CAP GEMINI

CEO defends performance, says management changes at U.S. Chamber were conflict source

BY JULEKHA DASH

As the season of charitable giving rises to its peak, one major charity won't have the $12 million system it had hoped would centrally process donations.

Last month, the United Way of America terminated a $12 million contract with Cap Gemini America Inc. after a third party found more than 400 problems with the system.

The system, which took about two years to develop before it was scrapped, was designed to streamline processing to boost the percentage of donations going to philanthropic causes, rather than administration, officials at the nonprofit organization said.

At the same time, Cap Gemini — the U.S. arm of Europe's largest information technology consulting firm — faces complaints from the U.S. Chamber of Commerce, which filed suit against the company Oct. 15, alleging it failed to upgrade the organization's legacy systems, according to a senior Chamber of Commerce official. That charge came after the Washington-based organization ended a 10-year, $75 million outsourcing deal with Cap Gemini.

Cap Gemini initiated its own lawsuit on the same day, defending its performance and charging that the Chamber of Commerce owes it $5.3 million for services rendered.

Michael Meyer, Cap Gemini

Cap Gemini, page 14

AUTO COALITION SELLS EXTRANET

Deeper pockets sought to build network's use

BY CRAIG STEDMAN

Lacking the money or the manpower to continue going it alone, the founders of the Automotive Network Exchange last week agreed to sell the private extranet to a technology firm with the resources and wherewithal to jump-start it.

Plans designed to attract more users to the ANX by lowering access costs and opening it up to other industries were already in the works before the sale to San Diego-based Science Applications International Corp. was negotiated.

But the Automotive Industry Action Group, a trade associa-

Extranet, page 16

FLASH! ERP WORKS IF YOU'RE CAREFUL

Drug distributor says deadlines, budget met

BY CRAIG STEDMAN

For a change, here's the story of an ERP user that looks to be getting it right.

McKesson HBOC Inc. next month will start installing the final phase of a $50 million SAP R/3 back-office system that already processes some of the largest transaction volumes ever handled by enterprise resource planning software.

But what may be even more noteworthy is the way the $30 billion pharmaceuticals distributor has rolled out SAP AG's ERP applications. As it enters the home stretch, McKesson HBOC has a perfect run going: 12 on-time deliveries of different pieces of R/3.

The San Francisco-based company has also managed to stay within its budget and avoid the kind of high-profile business disruptions that have recently afflicted other SAP users, such as Hershey Foods Corp. and Whirlpool Corp.

ERP, page 14

SUN DROPS JAVA STANDARD

Decision spurs mixed reaction among users

BY CAROL SLIWA
NEW YORK

Sun Microsystems Inc.'s decision last week to abandon its formal Java standardization efforts left users — and heavy investors in the technology, like IBM — licking their wounds.

Sun had spent more than two years trying to standardize a core piece of the technology through independent standards bodies — an effort many users hoped would quell the danger of Java fragmenting like Unix did, with operating system versions varying by vendor.

"Once [a technology] gets standardized, that tends to keep it from being a moving target quite so badly," said Mike Stolz, a consultant at Merrill Lynch & Co.'s technology group in New York.

Java, page 85

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INTEL CEO PUTS IT IN ITS PLACE

Intel CEO Craig Barrett, who has helped boost his company's Web sales, says IT should not lead a company's e-commerce efforts. Page 49

ANDY FREEBERG

BANK MERGER LESSONS

FleetBoston's Joseph Smialowski says he has used lessons from other mergers in his bank's strategy. Page 24

MARC GERLOW

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Join the countdown to the millennium rollover *and track the aftermath! Go to our Y2K Watch home page* **(www.computerworld.com/y2kwatch)** *for global reports, a Y2K forum, quick polls, legal and post-***Y2K advice**, *links to Y2K stories and resources, day-after commentary and scads of* **Y2K facts** *and* **trivia**. *Questions? Tips? Contact us via our Y2K mailbox at* **y2kwatch@computerworld.com.**

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34 TAX COLLECTIONS ARE UP nationwide despite the moratorium on Internet taxes, U.S. Rep. Christopher Cox says.

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50 JARGON JUDGE TAKES issue with the overuse of acronyms for business services, which is constantly changing.

86 Y2K WORRIES overshadow Microsoft and Sun standards issues and other IT internal politics, says Frank Hayes.

AT DEADLINE

E-Commerce Guidelines Set

A set of international consumer protection guidelines for e-commerce was finalized last week by the Organization for Economic Cooperation and Development, an organization representing 29 countries. The guidelines aren't legally binding. They are online at *www.ftc.gov/opa/1999/9912/oecdguide.htm.*

'Mini-Mainframes'

Users will have to wait until late 2001 to see if they work, but IBM hopes to make Windows 2000 servers into miniature mainframes. The chip set – code-named Summit – would transfer IBM mainframe design principles to servers based on Intel Corp.'s upcoming 64-bit architecture.

Cell Phones 'Hacked'

Two Israeli researchers said in a paper published last week that they had successfully attacked the encryption algorithm used to secure Global System for Mobile Communications (GSM) cellular phone service. The findings will be discussed by the GSM security working group this week.

Guilty Virus Plea

The man arrested for creating and distributing the Melissa Word macro virus pleaded guilty in U.S. District Court in Newark, N.J., last week to a second-degree charge of computer theft. David L. Smith, 31, a former computer programmer from Aberdeen, N.J., was charged in April.

Short Takes

Santa Monica, Calif.-based middleware maker CANDLE CORP. announced new divisions today and last week as part of a reorganization and sharpening of focus on managing the enterprise for the Web. . . . MICROSOFT CORP. last week settled on Version 1.0 of the BizTalk.org specification for Extensible Markup Language. . . . Emeryville, Calif.-based SYBASE INC. said it will deliver its enterprise portal architecture, OpenDoor, by the end of the first quarter next year.

Observers: SAP's Nod to DB2 of Little User Impact

IBM database's 'preferred' status seen as slight to Oracle, which competes in ERP

BY ROBIN ROBINSON AND CRAIG STEDMAN

SAP AG'S anointment of IBM as its preferred database vendor was met with skepticism by users and analysts last week.

The companies said they'll work closely to develop interfaces between IBM's DB2 and SAP's R/3 and other business applications.

The move is seen as a snub of Oracle Corp., whose databases are used by 75% of SAP's installed base — 16,000 customers worldwide, according to Jeremy Burton, a marketing vice president at Oracle.

But the two companies compete fiercely in the applications business. "SAP is feeling Oracle encroaching on their accounts. It's really an attempt to try and lock us out," Burton said of the announcement.

SAP officials weren't available for comment on the IBM deal.

Armen Tekerian, vice president of enterprise systems at McKesson HBOC Inc., said he's more amused than anything else by SAP's deal with IBM. "This certainly isn't for technical reasons, from what I can see," he said. "It's more for political reasons."

Top Performance

McKesson, a pharmaceuticals distributor in San Francisco, chose Oracle two years ago as the database supporting its SAP R/3 back-office system. The combination of the database and Sun Microsystems Inc.'s high-end Unix servers "just blew everything else away" on performance, Tekerian said. There's no reason to switch, he said, even though DB2 appears capable of reaching the same throughput levels as Oracle.

SAP and Oracle "would be cutting off each other's arms to spite themselves" if they don't make sure R/3 and the database remain tightly synchronized, Tekerian added.

Several analysts agreed, noting that the arrangement with IBM isn't exclusive, nor the first.

Five years ago, SAP said it hoped to move 30% of new R/3 installations to databases developed by Informix Corp. in Menlo Park, Calif. Last spring, SAP acquired the rights to sell its own version of Adabas D, a database developed by German vendor Software AG. And SAP began this year arm-in-arm with Microsoft Corp., whose SQL Server 7.0 database was the latest to support R/3.

"I don't see that this has dire consequences for the installed base. SAP will continue to support the Oracle platform, just as it has always done," said Steve Hendrick, an analyst at International Data Corp. in Framingham, Mass. But the SAP deal "is testimony to IBM's success in making [its] distributed database products industrial-strength and extremely competitive," he said.

MOREONLINE

For more resources on SAP, such as FAQs and articles, visit our Web site.
www.computerworld.com/more

Online Banking Drains Core IT Support

Initiatives pull IT support from day-to-day services

BY THOMAS HOFFMAN
MIAMI BEACH

Are banks robbing Peter to pay Paul.com?

As banks pour more resources into Internet banking, they're starting to worry that information technology support for day-to-day operations will suffer.

CHASE.COM'S Ronald A. Braco says separate entities help protect core resources

Executives attending a banking conference here last week said their institutions are having a tough time stretching their already lean IT staffs to tackle hot projects such as online banking and customer relationship management.

The topic was discussed at the Bank Administration Institute's Retail Delivery '99 conference.

"It's definitely something that we've been struggling with: How do you grow e-commerce without emasculating [support] for these other core businesses?" said Josh Grotstein, a division executive at Citigroup Inc. in New York.

So far, bank IT departments may be shorthanded but there's no evidence that core banking activities such as checking accounts or credit-card operations have run into any glitches outside of the occasional merger-related gaffe, said Bill Bradway, an analyst at Meridien Research Inc. in Newton, Mass.

But bankers worry that it may be only a matter of time before something gives. And the problem isn't exclusive to U.S. banks.

For example, Newfoundland and Labrador Credit Union in St. John's, Newfoundland, is running into "serious" resource constraints trying to support its 11 locations, spread out over an area the size of Texas, said Mike A. Boland, credit union president.

Meanwhile, the credit union is trying to pursue an aggressive Internet banking strategy because deregulation of the Canadian banking industry has led virtual banks to enter its turf and offer customers lower rates, Boland added.

The support problems, he said, "are hampering our ability to innovate."

The solution seems to depend on each bank's corporate culture.

"Banks that have always provided strong customer support — like First Tennessee — will continue to do so and provide good Internet support," said Paul Murphy, head of Murphy & Co., a St. Louis-based bank consultant.

Separation Anxiety

Some banks, such as The Chase Manhattan Corp., have created dot-com entities that separate e-commerce from regular IT.

Chase.com, established last summer, helps "protect important [IT] resources" within the core bank to run day-to-day operations, said Ronald A. Braco, who heads up Chase.com in New York.

The 100 or so people who make up Chase.com primarily focus on business-to-consumer and business-to-business online opportunities, while the bank's primary IT staff supports its core operations, Braco said.

Still, separation isn't that simple. Braco and Chase President and CEO William B. Harrison said the parent bank is Web-enabling all of its business lines.

"We're only in the first or second inning of a nine-inning game," said Harrison. Perhaps, but pretty soon bank technologists might be looking for some relief pitchers.

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Internet Tax Group May Never Agree on a Plan

Divided commission has two meetings to go

BY PATRICK THIBODEAU

THE COMMISSION charged by Congress to produce an Internet taxation proposal stands a good chance of never agreeing on a final plan. Key members — including commission chairman Virginia Gov. James Gilmore — have taken seemingly irreconcilable positions, making compromise difficult at best, said some commission members and observers.

Next week's meeting of the Advisory Commission on Electronic Commerce in San Francisco — its next to last — may tell whether the group can agree. A final vote on an Internet tax plan is due in March.

"I think this is the meeting" to determine the group's direction, said commission member Stanley Sokul, a consultant at the Association of Interactive Media in Washington.

But Sokul said odds are long that the group will reach the required two-thirds vote — or 13 of the 19 members — for any Internet taxation plan.

Another member, Grover Norquist, president of Americans for Tax Reform in Washington, said an agreement is impossible on all but a few issues.

For example, the commission may oppose tariffs and international taxes on e-commerce, taxes on digitally transmitted goods and taxes on Internet access, he said. It may also recommend getting rid of a federal excise tax on telecommunications. But those are simple issues compared with the Internet taxation.

The commission was formed last year, after Congress passed a three-year Internet tax moratorium. The group can be divided into two camps: those led by Gilmore, who oppose taxes on e-commerce, and those who say states should be able to collect taxes from remote sellers.

States Concerned

States say they will see significant tax revenue losses as sales shift to out-of-state e-commerce merchants. A 1992 Supreme Court ruling bars states from collecting taxes from companies that don't have a substantial physical presence in their state.

A coalition of companies, including America Online Inc., Sears, Roebuck and Co. in Hoffman Estates, Ill., Wal-Mart Stores Inc. in Bentonville, Ark., The Gap Inc. in San Francisco and Microsoft Corp., wants tax collection simplified to reduce administrative costs.

But the group, named the eCommerce Coalition, isn't suggesting how taxes should be collected. Its members say that once the tax system is simplified, the legal barriers to out-of-state collections will ultimately fall, through new court actions, legislation or the collective decision of states.

"None of [the coalition members] believe that taxes should be providing competitive advantages or disadvantages," said Joseph Cosby, a coalition spokesman who is a tax expert at Ernst & Young LLP in Washington. "Clearly, it is the case now that those that are on the Internet that don't collect [taxes] don't have the same burden that those that are in the state [do]."

But Jim O'Brien, director of corporate taxes at Eastman Kodak Co. in Rochester, N.Y., said simplification may not help large companies such as Kodak, which already pays taxes in all states.

"It's only going to benefit really the remote sellers and start-up companies," he said.

Polar Opposites

The Advisory Commission on Electronic Commerce will consider a variety of Internet taxing schemes next week. A deep split in the commission can be roughly divided into the following camps:

NO TAXES: Proponents want to eliminate all Internet taxes and preserve the requirement that remote sellers are under no obligation to collect taxes in states where they don't have a substantial physical presence.

TAXES: Some states and local governments want the ability to collect taxes from remote sellers. They have allies among brick-and-mortar retailers concerned that Internet-based sellers have an unfair advantage.

MOREONLINE

For more on Internet taxation, such as groups and directories, visit our Web site.
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Moratorium Survives WTO

Deal means no e-commerce tariff

BY PATRICK THIBODEAU

World trade talks ended last week in Seattle without any formal agreement to extend the moratorium on tariffs on e-commerce. But U.S. trade officials said an informal "political commitment" was reached that may keep the moratorium in place for as long as two more years.

"We have no reason to be concerned," said Thomas Tripp, a spokesman for U.S. Trade Representative Charlene Barshefsky. He said the informal consensus among World Trade Organization (WTO) members for the moratorium was solid.

The moratorium will continue until the fourth WTO ministerial meeting, which hasn't been scheduled yet, and should be safe for at least two years, said Tripp.

Despite the lack of a formal agreement, "most countries intend to continue to honor it whether the existing moratorium is legally binding or not," said Harris Miller, president of the Information Technology Association of America in Arlington, Va. "None of these countries wants to be identified at this point in time as anti-Internet or anti-e-commerce. That would be too risky to their potential ability to become an active player in the global Internet economy."

Top Priority

The extension of the moratorium — which was first set by the WTO in 1998 and was to last for two years — was a priority of U.S. trade officials and industry groups that represent companies involved in e-commerce. The moratorium prohibits countries from applying tariffs on goods that arrive electronically, such as software, music and video.

E-commerce is a relatively new issue for the WTO, and a key goal of U.S. trade groups was to keep the WTO from introducing new regulatory schemes that could burden Internet commerce.

Correction

Due to an editing error, a Nov. 22 story, "Compaq Takes A Hit" [Technology, page 70], incorrectly described Sun Microsystems Inc.'s Solaris operating system as a comparatively small player in the Unix operating system market. Recent reports have placed Solaris among the top sellers in that market.

Travel Sites Cut Ticket Deal

Will refer customers to one another

BY JULIA KING

Priceline.com, Travelocity.com and Preview Travel last week struck a landmark deal to sell airline tickets online through all three companies' Web sites.

The three online travel companies will refer customers to one another's sites and collect a referral fee for customers who buy there.

The deal gives all three an additional competitive edge against rival Expedia.com, said Melissa Shore, an analyst at Jupiter Communications Inc. in New York. It also gives the Travelocity/Preview partnership quick and low-cost access to Priceline.com's online price bidding capabilities.

However, shortly after the announcement, Expedia countered by announcing plans to also offer name-your-own pricing for airline tickets.

"Preview and Travelocity realize that there are multiple segments of customers online and that their sites do not serve all customer groups. An arrangement with Priceline lets them acquire the capabilities to serve customers looking for the cheapest fares," Shore said.

Brian Ek, a spokesman for Priceline.com in Stamford, Conn., said the Preview and Travelocity sites will both feature a button to Priceline.com for customers who want to name their own price for an airline ticket. Priceline, on the other hand, will refer customers whose ticket bids aren't accepted to the lowest fares published on Travelocity.com and Preview.com.

Ek said information technology groups from all three sites are working together to create seamless networking connections. The referral service will be up and running during the first quarter of 2000, he said.

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BRIEFS

Sun Says 'Sorry' to Development Group

Sun Microsystems Inc. apologized to members of the open-source development group Blackdown for failing to credit them for fundamental work on Sun and Scotts Valley, Calif.-based Inprise Corp.'s port of the Java 2 platform to the Linux operating system. The perceived slight contributed to ongoing tension between Sun and some members of the open-source community.

Six Firms Back Digital Payment System

Six companies are backing a new digital payment system. Called Account Authority Digital Signature, the system can be used on the Internet or at cash register terminals, with a smart card and personal identification number. The companies are First Data Corp. in Atlanta, Compaq Computer Corp., Transaction Systems Architects Corp. in Omaha, Certicom Corp. in Hayward, Calif., InterWorld Corp. in New York and CyberSafe Corp. in Seattle.

E-Commerce Traffic Up 44% From 1998

Audience measurement firm Media Metrix Inc. in New York has reported that for the week ended Dec. 5, traffic at e-commerce sites increased 44% over the same period last year. Significant traffic spikes occurred at toy, book, music, apparel and auction sites. Department store sites such as Wal-Mart.com and Sears.com gained 222% more visitors this year, according to the report.

Six Millionth Patent Goes to Palm

The U.S. Patent and Trademark Office issued its 6 millionth patent last week, to Santa Clara, Calif.-based Palm Computing Inc. for its HotSync technology. HotSync lets users synchronize data with a computer. The first patent was issued in 1836, although the U.S. had been issuing unnumbered patents since 1790.

Sun, Netscape Develop Bill Payment Software

BillerXpert supports standard set by three banks, may expand adoption

BY STACY COLLETT

SUN MICROSYSTEMS Inc. and Netscape Communications Corp. last week released an electronic bill presentment and payment system that meets standards set by several major U.S. banks.

Observers said this latest standard may help bring more billers to the online arena, where critical mass is important in attracting customers who will use the billing service. Though online banking is growing in popularity, billers have been slow to sign on because of myriad bill-presentment requirements.

By 2002, 70% of bills will be available online, according to Jupiter Communications Inc. in New York.

The software, called iPlanet BillerXpert Consolidator Edition, lets multiple billers, such as credit-card companies, retailers and utilities, present bills in a common format via the banks' Web sites. Bank customers can pay all of their bills from one source.

Standard Fare

The software meets standards developed by The Chase Manhattan Bank in New York, First Union Corp. in Charlotte, N.C., and Wells Fargo Bank in San Francisco as part of the Spectrum consortium.

The Spectrum standard requires bill payment software to respond to open financial exchange messages, which are industry standard messages that direct transactions such as customer enrollment.

"Forty to 50% of a biller's costs can be decreased [using electronic bill payment and presentment], by reducing paper handling, paperwork, postage, distribution and other costs," said Ronald A. Braco, a senior vice president at Chase Manhattan. Combined, Chase, First Union and Wells Fargo handle 600 million bills each year, Braco said.

The BillerXpert software is being tested by First Union and will roll out in the second quarter of 2000 with one biller, First Union's credit card, according to Lou Anne Alexander, vice president of emerging payments at First Union.

Online Converts

Today, approximately 1 million First Union customers pay bills online using outsourced payment services from Norcross, Ga.-based CheckFree Holdings Inc. Alexander said she expects 25% of those customers to switch over to BillerXpert by this time next year. The software lets customers view a summary of their bills from their service providers and pay a bill or link to the provider for more information.

BillerXpert is different from other billing software on the biller side. It tracks individual customers' payments for the biller, rather than giving the biller one lump check with a listing of paying customers that it then must cross-reference.

Wells Fargo Bank has experimented with electronic bill payment and so far has converted 1 million of its customers to online bill payment, said Robert Sterling, an analyst at Jupiter Communications.

"[Wells Fargo] has a 50% lower attrition rate among customers who use online bill-paying services," Sterling said. "They tend to drive more online revenue from those customers. They tend to keep a higher account [balance]."

Senior editor Thomas Hoffman contributed to this story.

JUST THE FACTS

The Spectrum Standard

What is the Spectrum standard? An online bill payment and presentment standard requiring software to respond to open financial exchange messages, which are industry standard messages that direct transactions like customer enrollment.

Who developed the standard? First Union Corp., The Chase Manhattan Bank and Wells Fargo Bank.

Do participating banks have to use BillerXpert Consolidator software? No. Only First Union is using the Sun/Netscape BillerXpert. Banks can use the technology of their choice, as long as it conforms to the Spectrum standard.

IBM Supercomputer a Feat

Project is ambitious but possible, prof says

BY JAIKUMAR VIJAYAN

IBM's $100 million bid to build a supercomputer that's 500 times more powerful than the fastest computers today will be a challenge to pull off in the promised five years.

But it's by no means impossible, said Arvind, a professor of computer science and technology at MIT.

"It is going to require brilliant engineering ... but I think it is possible to do it. They have the capability, and their architecture makes a lot of sense," Arvind said.

IBM'S AMBUJ GOYAL: Initial transaction will help fight diseases

IBM last week launched an ambitious research project to build a computer that will be capable of calculating 1 quadrillion operations per second, or 1 petaflop. The performance would make it about 1,000 times faster than IBM's chess-playing Deep Blue supercomputer and about 2 million times faster than today's most powerful PCs.

Nicknamed Blue Gene, the system will initially be used to perform a transaction that will take a full year — but that would take 1,000 years with today's supercomputers.

The transaction will model the folding of human proteins, a process in which the strings of amino acids that form a protein fold into highly complex 3-D shapes that determine the protein's function.

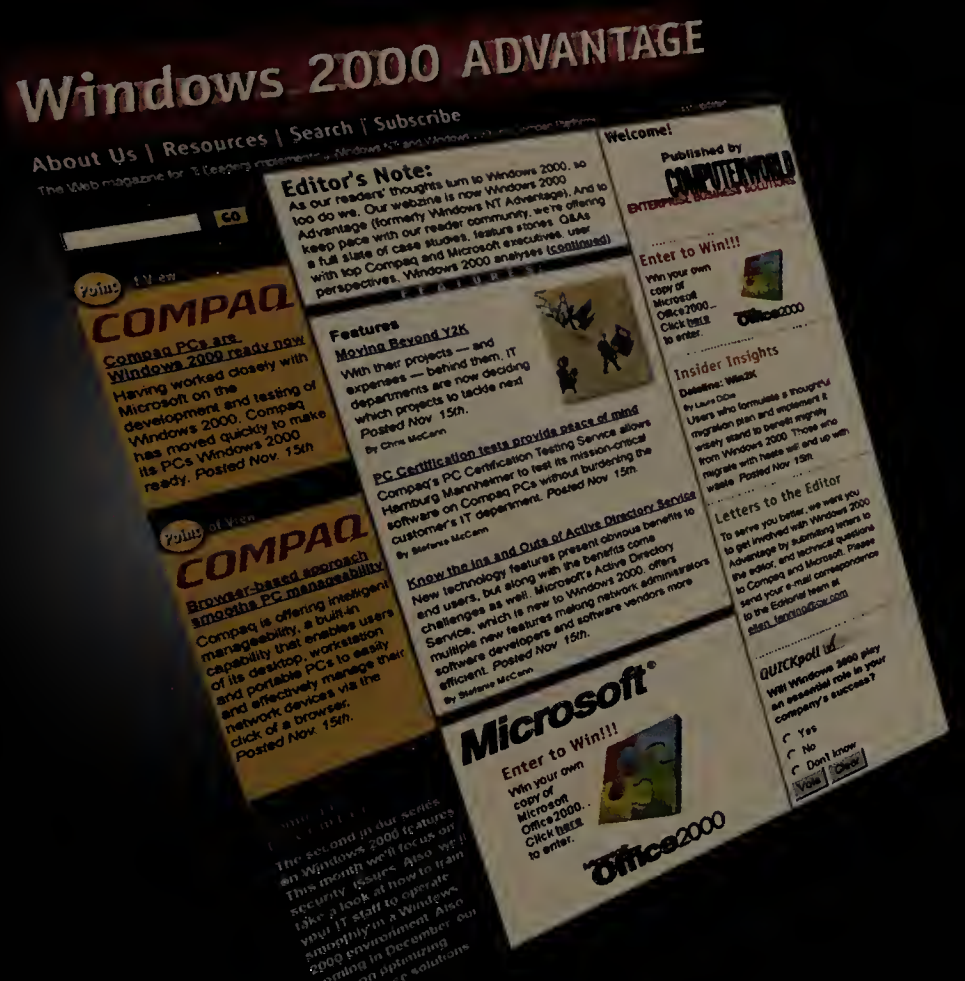
This folding process will involve more than 1 trillion calculations for each of the 1 billion ways that a protein can fold.

The model that IBM will initially run on Blue Gene — involving a 324-amino-acid protein — will take one full year to compute.

"No one's been able to do this before," said Bernard R. Brooks, a principal investigator at the National Institutes of Health in Bethesda, Md. "It could be done in principle, but today's computers are simply not fast enough." Today's fastest computers would take more than 1,000 years to do the same thing, said Monty M. Denneau, an IBM research staff member.

A better understanding of the protein-folding process would provide better information on diseases and ways to combat them, said Ambuj Goyal, vice president of IBM's systems and software group.

The tennis-court-size Blue Gene will have 1 million processors, each capable of executing 1 billion operations per second. The system will be based on a highly optimized massively parallel architecture capable of automatically detecting and overcoming failures of individual processors and computing threads. IBM calls the architecture SMASH, for Simple, Many And Self-Healing.



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COMPUTERWORLD
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CA Advances Neural Network System

BY SAMI LAIS
ISLANDIA, N.Y.

Computer Associates International Inc. this week will announce data sets of neural network "experience" to give a learning boost to networks running its business intelligence framework from its InterBiz Solutions unit.

Billed as Unicenter TNG for the CEO, the BizWorks framework uses CA's Neugent neural network software to track and predict business — rather than information technology infrastructure — events. CA plans to release BizWorks at its annual conference in April. The firm is creating the packaged experiences, called Intellikits, for use with the BizWorks framework.

As an enterprise using the application trains its systems, the Intellikits supply data on business events to the BizWorks control center, said Israel Levy, vice president for business development at InterBiz. Although users can't customize the data, they can refine the business rules.

But neural network developer Richard Gordon at consultancy Predictive Systems Inc. in New York, warned against expecting customized results from prepackaged models. Neural networks "are high-powered algorithms and require detailed knowledge" to train and initialize, he said. What neural nets offer that pure statistics don't is the ability to elicit results when working with incomplete data that's specific to an organization, he said.

But Neugents encompass more than neural networks, said Brandon Musler, a Neugent business manager at CA. Neugents' "adaptive pattern recognition" also includes statistical algorithms and other artificial intelligence technologies, he said.

Custom neural network developer Nestor Inc. in Providence, R.I., specializes in fraud detection in the financial industry. A Nestor spokesman said that, typically, neural network developers would review three months of transactions, taking those the company hadlabeled fraudulent and a subset of good transactions to build a data set.

The developers would examine transaction data elements, such as frequency, time and store, to discern patterns that correlate with fraudulent transactions. Using that data, they would refine the company's rules and build a neural net model that would work in conjunction with the rule set.

Rules Are Rules

At CA's annual conference in July, CA President and CEO Charles Wang said, "We may write a rule that says, 'Only the president may write a check for $1 million.' " But that rule alone wouldn't stop somebody "from writing 10 checks, each for $100,000."

In writing such rules, an enterprise can fine-tune its implementation of Neugents, Levy said. "BizWorks uses [that] rules-based system to correlate business events for the user," he said.

The first kits are scheduled for release by summer and will target check kiting, account delinquency and fraud detection. No pricing is available yet.

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Bookseller to Print Books on Demand

Barnes & Noble's deal will reduce inventory, digitally print books

BY CHRISTINE McGEEVER

Bookseller Barnes & Noble Inc. is getting into the printing business one book at a time. The online and bricks-and-mortar seller is using print-on-demand systems from IBM to fill customer orders from its existing distribution centers. The first such system will be operating at Barnes & Noble's Jamesburg, N.J., distribution center by spring, according to the companies.

Initially, books from approximately eight publishers will be available through the print-on-demand system, but Barnes & Noble expects to expand the number of participating publishers next year, according to Ken Brooks, Barnes & Noble's vice president of digital content. Brooks declined to name publishers participating currently.

Brooks said Barnes & Noble expects print-on-demand to reduce its inventory costs and widen its customers' access to less popular books, out-of-print books and even books that have yet to be published. Print-on-demand technology is a way for publishers to test-market and circulate galley forms of books for review as well as publish books that have press runs too small to be offset-printed economically

"If you aren't sure it's going to sell, use digital technology," said Rich Troksa, an IBM marketing director. No book maintained in digital format will ever go out of print, he added.

Troksa said IBM's data warehousing and 600 dpi resolution printing system would produce complete softbound books, with color covers and illustrations included. Books produced in this manner are "virtually indistinguishable" from offset-printed books, according to Troksa.

Once a book is printed, trimmed and bound using the IBM system, it would be shipped to the customer from Barnes & Noble's distribution center. Brooks said a lead time of at least 24 hours would be required to fill such orders.

In June, Borders Group Inc. in Ann Arbor, Mich., announced a print-on-demand effort with Atlanta-based Sprout Inc. to print high-quality, out-of-stock paperbacks in stores in 15 minutes [News, June 7].

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Self-Updating Virus Poses as Y2K Fix

Advice: Update virus scans, firewall settings

BY ANN HARRISON

A CLEVER VIRUS that automatically updates itself from the Internet is circulating disguised as a year 2000 problem fix, according to the Symantec AntiVirus Research Center in Santa Monica, Calif.

Known as W95.Babylonia, the virus affects Windows 95 and 98 users. It's unique because it has the ability to wait for an Internet connection and then download several files from a designated Web server. The Japanese-based server, which has been shut down, has been linked to a U.S. group called Source of Kaos, according to Trend Micro Inc. in Cupertino, Calif.

The unique design of the Babylonia virus allowed virus writers to centrally update it to defeat attempts to block it. It could also send a custom payload to infected computers based on user information sent back to the virus creator. The virus automatically sends an e-mail to babylonia_counter@hotmail.com to track infected computers and gather data, Symantec said.

VIRUS ALERT

"It's very scary," said Jeffrey Baker, a network manager at telecommunications gear maker Harris Corp. in Melbourne, Fla. "What we have seen in the past is that viruses can spawn themselves and move around a company and delete data off a [shared network]. Now they can gather stuff off remote servers and start copying your data or start looking for specific things in your environment."

W95.Babylonia propagates using Windows-based Microsoft Internet Relay Chat (MIRC) software. When an infected user logs on to MIRC, the program automatically sends the virus to everyone within the same MIRC chat room, appearing as a Y2K bug fix. When the file is executed, it infects other 32-bit .exe program files and Windows Help files.

The virus can also be sent as an e-mail attachment and launched when the attachment is opened. The virus can spread itself through a network quickly via shared network drives, Symantec said.

Symantec suggests companies configure their firewall software to block unauthorized connections to external Web sites. As always, users should also keep their virus definitions updated, be wary of opening unknown executables and verify suspicious e-mail, Symantec said.

Baker said companies need to examine data that comes into the network via e-mail, Web traffic, Java executables on client machines and even through Sendmail servers on Unix clients. Companies can deploy virus updates with digital audio tapes (DAT), but users are still able to download viruses from the Web and execute them on local, unprotected machines.

Harris Corp. has set up an effective antivirus strategy with the help of Santa Clara, Calif.-based Network Associates Inc.'s Prime Support service, Baker said. The service provides DAT updates that can be loaded directly onto production machines.

Next Up vs. Microsoft: $1.6B Caldera Suit

Microsoft moves to keep DOJ findings out of private case

BY KIM S. NASH AND PATRICK THIBODEAU

In its next major antitrust battle — a private suit due to begin trial in February — Microsoft Corp. doesn't want the jury to hear about the damaging findings in the U.S. Department of Justice's case.

Microsoft recently made a motion to prevent Caldera Inc. from introducing Judge Thomas Penfield Jackson's findings of fact, in which he blasted Microsoft for being a predatory monopolist.

Caldera sued Microsoft in 1996, charging that it illegally tied Windows 95 to the MS-DOS operating system and created artificial incompatibilities between Windows and Caldera's version of DOS, known as DR-DOS.

Microsoft has denied the charges and has sought several times — unsuccessfully — to get major parts of the case dismissed.

Last week, the parties met with U.S District Court Judge Dee Benson in Salt Lake City to set the agenda for the first days of the trial. Benson delayed the opening day two weeks, from Jan. 17 to Feb. 1, while he oversees an unrelated case.

The first week is expected to be spent hearing various motions, including Microsoft's latest one to quash any mention of Jackson's findings.

Jackson's findings are little more than hearsay evidence, said Steve Aeschbacher, Microsoft's lead lawyer on the Caldera case. Using them to influence a jury is "sort of a recipe for unfairness," he said.

Yet Caldera hasn't said it wants to introduce the findings — nor can it, unless Jackson makes them part of a final ruling, said Steve Hill, Caldera's lead lawyer.

However, Caldera could use the findings as a road map, matching some of its claims against Jackson's opinions, said Rich Gray, an antitrust lawyer in San Jose.

One factor that's similar in the two antitrust cases is the matter of "tying," according to Hill, a lawyer at Snow, Christensen & Martineau in Salt Lake City.

The Justice Department has said bundling the Internet Explorer browser with Windows is an illegal tying of separate products. Caldera, meanwhile, accuses Microsoft of a similar illegal tie: that of MS-DOS to Windows 95.

"Every copy of Windows included a copy of MS-DOS, even though people were generally not aware of that," Hill said. "It was to force people to take one product when they bought the other."

Aeschbacher said he plans to show in court that Caldera's problems were the result of its own failed product strategy.

"They want to blame the fact that they didn't succeed on Microsoft, instead of on the fact that they chose a path that's really hard to execute on and they didn't do it very well," Aeschbacher said.

The Caldera case doesn't necessarily carry the same risks for Microsoft as the government's antitrust case, said Robert Hauberg, an antitrust attorney at Baker, Donelson, Bearman & Caldwell in Memphis and a former Justice Department lawyer.

Because the Caldera case is about events that occurred in the early 1990s, Microsoft isn't likely to face court-ordered actions that would affect current contracts or force it to repackage today's products, Hauberg said.

"The marketplace has moved," he said, adding that financial damages are the likely relief if Caldera wins.

In one relief proposal from Caldera, the company asked the court to force Microsoft to pay $1.6 billion.

Caldera vs. Microsoft

July 1996: Caldera sues Microsoft, alleging unfair business practices and antitrust violations in the DOS market.

February 1998: Caldera adds Windows 95 to the suit.

February 1999: Microsoft wins six-month delay of trial.

February 1, 2000: Trial scheduled to start.

Feds: Microsoft Broke Key Parts of Law

Microsoft Corp. violated key provisions of U.S. antitrust law, government attorneys declared last week in a court filing that also outlined the legal arguments for punishing the software giant.

The 70-page brief by the U.S. Department of Justice and 19 states details the government's legal conclusions to U.S. District Court Judge Thomas Penfield Jackson's findings. And while it offers the groundwork for tough remedies, the brief doesn't spell out exactly what the government will seek if it ultimately prevails.

The violations are based on the "findings of fact" Jackson issued last month. The judge will use the government's brief – and Microsoft's response, which is due Jan. 17 – to prepare his own "conclusions of law," or verdict, in the case.

The government's brief outlined a "textbook monopolization case" that focused on what may be the government's strongest legal argument: that Microsoft used its market power to exclude competition, said Dana Hayter, a former Justice Department antitrust attorney who is now an attorney at Fenwick & West LLP in San Francisco.

Microsoft spokesman Jim Cullinan said that "we do disagree with the government's assertions and believe at the end of the legal day, Microsoft's actions will be found to be pro-consumer and pro-competitive. We look forward to presenting our conclusions of law as this process continues, but we will always be willing to settle this case on a fair and reasonable basis."

Microsoft and government officials are involved in ongoing settlement talks with court-appointed mediator Richard Posner, chief judge of the U.S. Court of Appeals in Chicago. Neither side is commenting on the progress of those talks. – *Patrick Thibodeau*

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ERP Success

To pull all of that off, McKesson HBOC executives said, the R/3 project team put together an extremely cautious rollout plan and has stuck to it with a vengeance.

"We're very, very conservative in the way we're implementing [R/3]," said Armen Tekerian, vice president of enterprise systems at McKesson HBOC. "We just don't want to risk anything going wrong."

That conservatism stems partly from an earlier attempt to install R/3 that was killed in 1996 because of project management problems after $15 million had been spent. At the same time, the company was buying FoxMeyer Corp., a bankrupt competitor that blamed its demise on a failed SAP installation.

The system's size was also a reason for treading carefully. R/3 already processes sales orders totaling 1.5 million line items and $100 million worth of business each day, said John Amos, director of financial systems at McKesson HBOC. And SAP's materials management module — one of the biggest pieces for a distributor — is still to come.

There are very few cases of users running that kind of volume on R/3 or its ERP rivals, said Stephen Cole, an analyst at Forrester Research Inc. in Cambridge, Mass.

"They're working with a system that's not really proven at that level," Cole said. And McKesson "learned all it needed to know" about the dangers of trying to do too much at once on its first go-around with R/3, he added.

At McKesson HBOC, the different pieces of SAP's back-office applications are being installed one by one. Business managers sign off on a plan for each miniproject, and then it's "basically cast in concrete," Tekerian said. Any changes have to be approved by an executive steering committee that goes up to the CEO level.

Delays in the rollout schedule are virtually unthinkable. ERP projects "tend to unravel the longer they go on," Amos said. "We don't miss dates."

The project managers were equally rigorous in the way they set up the team that's doing the installation work.

For example, they formed a separate group to test the ERP system so that the employees who configure the software aren't "proofreading their own work," Tekerian said.

And all the consultants who work on the project have to submit résumés and go through interviews. "We don't let [consulting firms] staff our project for us," Amos said.

McKesson HBOC also hasn't been afraid to change its lead consulting firm. After the initial R/3 debacle, it switched from PricewaterhouseCoopers to IBM's services unit. Then, a year ago, when the top IBM consultants working on the project broke away and formed their own firm, McKesson HBOC signed on with the start-up — Atlas E-Solutions Inc. in San Francisco.

Atlas has taken the lead role in a key part of the project — training end users and managing their expectations of what the ERP system will be able to do as each phase is completed.

Back-Office Makeover

Details of McKesson HBOC's R/3 project:

Budget: About $50M

Number of end users: 1,200 now; plans for 3,000 by 2001

Applications in use: Fixed assets, accounts payable, accounts receivable, sales and distribution, plus SAP's data warehousing software

Still to come next year: Materials management and an expanded data warehouse

Expected benefits: Y2K compliance, internal efficiencies and better management of working capital

R/3 has forced "tremendous changes" in the way the end users do their jobs, said Atlas consultant Frank Shines. To help prepare them, the project team used surveys, focus groups, demonstrations of the system and computer-based training before even starting formal training classes.

And when each R/3 module is turned on, Amos said, McKesson HBOC runs only about 10% of the intended transaction volume for the first 30 days to make sure the system doesn't collapse. That gets scaled up to 60% of the workload for another month before full usage finally starts.

That formula won't change with materials management, which is due to go live in a phased rollout starting next July. ◗

Continued from page 1

Cap Gemini

America president and CEO, described the lawsuit against the Chamber as a "collections matter" and defended his company's performance while attributing some problems at the Chamber of Commerce to management changes.

Meyer said that during the engagement, which began in March 1997, "the management team at the Chamber changed. They had a different vision and expectations than what we set out to do. We started out putting in a straightforward package. We delivered complete integrated working systems."

Meyer added that Gemini is "overall quite proud of our deliveyr record" and cited a finding that clients reported a satisfaction rating of 4.63 out of 5.0.

But the Chamber of Commerce claimed that it was Gemini's project team that was plagued with turnover problems, saying that Gemini fired several key project team members. The only senior official joining the Chamber was the president, in September 1997.

Meyer said voluntary turnover at Cap Gemini is 18% in the U.S. That's a figure that Michael Norris, an analyst at Kennedy Information LLC in Fitzwilliam, N.H., said falls just under the industry average.

As for the United Way, Meyer said he wouldn't comment on Cap Gemini's relationship with the nonprofit group, citing client confidentiality.

But at Alexandria, Va.-based United Way, Anthony De Cristofaro said the group had high hopes for the system and its relationship with Cap Gemini.

"The system would have made it more efficient for companies and the United Way to transfer pledges," said De Cristofaro, United Way's vice president of marketing. Because individuals make contributions to one of 1,400 independently run local United Way organizations, the system would have centrally managed contributions that are made through payroll deductions.

After the system, which took two years to develop, failed to process donations from employees at The Williams Cos., a pipeline and communications company in Tulsa, Okla., United Way officials said an evaluation by New York-based Deloitte Consulting LLC concluded that the system couldn't process donations on a national scale. Cap Gemini failed to identify or correct any of the problems, De Cristofaro said.

Though the United Way couldn't cite dollar figures for the savings the system could bring, the charity hoped that by centrally processing donations, the system could help reduce administrative costs, thereby ensuring more money goes to philanthropy.

Without a centralized system, more than a half-dozen regional processing facilities continue to manage donations while United Way's board of directors considers other options. The United Way has also initiated a mediation process with Cap Gemini.

Meanwhile, across the Potomac River from the United Way, Cap Gemini continues to run the Chamber's data center.

Chamber officials said they wanted the consulting firm to implement a system that could capture membership information. But, they said, the project was crippled as Gemini sought to add extensive customization to a system that was supposed to perform basic functions. In its lawsuit, the Chamber of Commerce seeks more than $10 million in damages as well as an end to its relationship with Cap Gemini.

Consultant Peter Bendor-Samuel, CEO of The Everest Group in Dallas, said communication in outsourcing deals is a key. Clients should identify metrics for service levels and assign 10% to 20% of the contract value for one month as a penalty for failing to meet those levels.

Julie Giera, an analyst at Giga Information Group in Cambridge, Mass., said the experiences of the Chamber and United Way show that companies need to ensure their systems services vendor provides the right resources to do the job throughout a project.

"I would put some guarantees in the contract to make sure that 20% to 30% of [the consulting firm's] resources will be senior-level expertise," Giera said. Moreover, the client should have the right to request replacement of any team member for any reason. And the consulting firm should replace any departing project team member within 30 days, she said. ◗

BRIEFS

A Versatile VPN Box

Altiga Networks Inc. announced a virtual private network (VPN) concentrator, a single box that can be installed by Internet service providers or by corporations to provide VPN connections. Secure partitioning eliminates the need for separate VPN devices for each connected organization, according to Altiga. Pricing will range from $45,000 to $90,000 for 1,500 to 5,000 subscribers.

$345M Marketing Software Merger

Broadbase Software Inc., a Menlo Park, Calif., vendor of software for analyzing customers and planning product promotions, said it would acquire Rubric Inc., a maker of marketing automation software, in a stock deal valued at $345 million.

Short Takes

LUCENT TECHNOLOGIES INC. in Murray Hill, N.J., said it would offer Waltham, Mass.-based **NETCRACKER TECHNOLOGY CORP.**'s suite of network design and simulation tools. . . . Sunnyvale, Calif.-based **GO.COM**, the Internet subsidiary of **THE WALT DISNEY CO.** in Burbank, Calif., reported a **$1.06 billion loss for 1999**, up from **$991 million last year**, according to documents filed with the Securities and Exchange Commission.

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Exchange to Link Fragmented Market of Auto Parts Players

Start-up broker to build Web-based trading net for manufacturers, retailers

BY LEE COPELAND

PARTSDRIVER.COM Inc. plans to open an aftermarket auto parts trading exchange on the Web, the company is expected to announce this week.

PartsDriver.com, a start-up based in Brookline, Mass., will offer participating traders three buy-sell formats for parts: catalog-style listings, auctions and "parts wanted" postings.

The fragmented aftermarket parts industry is ripe for new entries, said Bob Parker, research director for enabling technologies at AMR Research Inc. in Boston. "In every industry, there are brokers that take excess inventory in the field and reshuffle it. But it's been Rolodex-based and inefficient," Parker said.

The aftermarket parts industry includes 600 parts manufacturers, more than 210,000 repair shops and 80,000 jobbers, AMR Research estimated.

"The technology capabilities are there now, and [inefficiency in the parts business] has been a long-standing problem," said Marc Lind, president and CEO of PartsDriver.com. Previously, vendors let excess inventory "sit on the balance sheet at the warehouse, or [they would] write it down for pennies on the dollar," or a liquidator would buy it.

The Web site will launch in the first quarter next year. New York-based systems integrator Razorfish Inc. is rolling out the site using LiveExchange 3.0 from Moai Technologies Inc. and Oracle Corp.'s 8i database. The site cost just over $100,000 to develop, officials said.

Using a Web browser, registered users can access the exchange to check parts availability and costs. The site will allow buyers to buy parts using purchase orders, credit cards or online escrow accounts.

PartsDriver.com hopes to add parts makers such as Genuine Parts Co. and Federal-Mogul Corp. and large retail buyers and distributors such as Carquest Corp. and AutoZone Inc. to its forum roster. PartsDriver.com will qualify all participating businesses and offer pre- and postsales services.

"We don't think there will be a winner-take-all proposition in the parts market. The market will not want to relinquish that much control to a single player," Parker noted. NetVendor Inc. and Dega.com Inc. also operate trading exchanges for parts and other industrial goods.

Lind said he expects to see traffic volumes of about 1,000 user hits per day on PartsDriver.com but average transactions of five figures and higher. Even with such a potentially large user base and high-dollar transactions, the company plans to keep its information technology staff small. PartsDriver.com intends to hire a chief technology officer and two technical employees. ◗

JUST THE FACTS

Parts Trading Exchanges

NetVendor Inc. in Atlanta operates *www.autopartsbin.com*, a trading exchange for automotive and industrial parts. The company also runs surplus trading exchanges for electronics, construction, aerospace and plumbing supplies.

Dega.com Inc. in San Luis Obispos, Calif., operates a Web site for automotive aftermarket, original equipment manufacturer and custom parts sales, as well as exchanges for heating, ventilating and air conditioning equipment parts and chemical substances.

Internet 1, Mars Polar Lander 0

BY JAMES COPE

Even though the Polar Lander never transmitted any photos from the Mars expedition, the Web site that was set up to display them received 22 million hits during the first days after the landing, officials said.

In addition, the host server at the University of California at Los Angeles was temporarily overwhelmed when the Lander entered Mars' atmosphere, because one news service had published its direct address. So instead of passing Mars Web pages over the Cable & Wireless USA network to four regional server centers, the server had to take care of thousands of direct requests, sources at Vienna, Va.-based Cable & Wireless said.

Sources said it took a couple of hours to work around the problem. But had there been image traffic from Mars, the network would have been ready to receive it. ◗

Continued from page 1

Extranet

tion of automakers and suppliers that owned the extranet, couldn't carry out the plans by itself. The AIAG is counting on SAIC to speed up the progress of the ANX, which has caught on more slowly than expected since it went live last year.

"We had our hands full just trying to keep up with the [operating] requirements on a day-to-day basis," said Don Hedeen, ANX director at the AIAG in Troy, Mich. The demands of e-commerce have "just gone way past our expectations from when we started this project," he added.

Hedeen and some automotive suppliers who rely on the ANX said they hope the sale to SAIC will lead to increased use of the virtual private network, which provides a secure pipeline for electronically exchanging purchase orders and other business documents.

About 280 companies now have connections to ANX, but that's below a 400-user target that the AIAG wanted to reach by year's end.

"The AIAG is a very political organization," said Paul Krikke, a business applications manager at Taylor Steel Inc. in Hamilton, Ontario. "When you put people from [the different automakers] in a room and ask them to make a decision, maybe they'll come back in a month and have it all worked out. SAIC should be much better at that."

Taylor Steel was one of the first two companies to start using the ANX. It sends more than 50% of its electronic data interchange transmissions to suppliers and metal-stamping plants over the extranet. Documents that used to take an hour to be sent via conventional networks can now be delivered in less than 15 minutes, Krikke said.

"I'd like to see 10 times that number [of current users]," Krikke said. "That's kind of where I thought we'd be at this point." More users would help reduce the costs that companies have to pay to take advantage of the network, he added.

General Motors Corp. in Detroit and Ford Motor Co. in Dearborn, Mich., said the sale doesn't mean they're turning their backs on the ANX, even though the two automakers are both developing online marketplaces to automate their purchasing [Page One, Nov. 8].

The ANX still has a big role to play as a network for information that's too sensitive to go across the public Internet such as product drawings, GM and Ford officials said.

The attempt to broaden the appeal of the ANX is expected to start next month with the addition of dial-up access that will let users avoid the costs and complexity of setting up a direct connection to the extranet.

Monthly dial-up costs will start at $150, compared with about $2,000 per month for a direct ANX link, Hedeen said. That could make the extranet affordable to "tens of thousands of suppliers," he added.

Also due early next year is the addition of a network directory service and expanded security capabilities, to be followed later that year by support for telephony, videoconferencing and collaborative product-engineering applications.

Tracy Trent, a senior vice president at SAIC, said ANX pilot projects in Europe and Asia should be ready for real use by spring. In addition, the first nonautomotive users — a group of health care organizations in Michigan — recently signed on to the extranet.

SAIC also plans to target industries such as steel and construction materials. Trent said the ANX will soon be renamed to drop the explicit reference to the auto industry.

The financial terms of the ANX sale weren't disclosed. As part of the deal, SAIC's plans for the extranet will be reviewed by a board of governors initially made up of 10 representatives from the company, the AIAG and the Big Three automakers.

SAIC is a $5 billion firm with more than 35 subsidiaries, including Internet domain-name registrar Network Solutions Inc. in Herndon, Va., and the former operations of Bellcore, now Telcordia Technologies Inc., in Morristown, N.J. Through Telcordia, SAIC was already overseeing certification of ANX users and service providers. ◗

JUST THE FACTS

The Automotive Network Exchange

- **What it is:** A virtual private network that connects automakers and some of their suppliers to one another. Uses include the secure routing for product specifications, design drawings and electronic data interchange transmissions.
- **Who uses it:** General Motors, Ford and DaimlerChrysler are all on board, and Toyota's North American operation plans to join next year. About 280 suppliers are connected to the network, while another 160 have signed up.
- **What's changing:** ANX has been managed by the Automotive Industry Action Group (AIAG) trade association. It now will be run by SAIC, with oversight from a board made up of representatives from SAIC, the automakers and the AIAG.

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IT Staffers Charged In Accounting Frauds

SEC cracks down, says IT managers should be able to catch scams

BY KIM S. NASH

THE HOME security business wasn't so hot in Florida in 1994 and 1995, meaning lousy quarterly financial reports for Sensormatic Electronics Corp. in Boca Raton, Fla.

Slashed prices and easy payment terms didn't produce sales that meet Wall Street's expectations. So Sensormatic executives told underlings — including information technology manager Thomas Pike — to doctor the books.

For almost two years, Pike dutifully directed his staff to roll back the computer clocks so that sales were booked sooner than they should have been and profits looked bigger. That simple act, which any IT manager can do, got Pike sued by the Securities and Exchange Commission (SEC). The SEC, which only recently closed the case, charged Pike with seven counts of violating or causing Sensormatic's violation of accounting rules. Pike couldn't be reached for comment.

Several IT professionals faced SEC suits recently for using their technology skills to help commit financial fraud or falsify accounting books.

Resetting computer clocks is a common trick. So is manipulating inventory reports to inflate the value of products.

And an interesting note in the Sensormatic complaint suggests that more IT departments could be investigated by the SEC: The agency said an IT director "is responsible for the accuracy and integrity of the documents and data generated by" a company's computer systems.

"If they're doing their job, they should catch [accounting fraud]," said Bill Baker, an SEC lawyer in Washington.

For example, he said, IT managers should know whether unauthorized changes have been made in general ledger, accounts receivable and other accounting software modules (see chart).

Though Pike escaped a fine — because he didn't appear to have profited personally from the crimes — he did suffer a common SEC punishment: He agreed to a cease-and-desist order not to commit such crimes again, and he endured a public airing of exactly what he had done.

"That's why we write complaints in narrative style. It's important to get the story out," said Paul Berger, another SEC lawyer in Washington.

KATHERINE LAMBERT

The SEC legal team pursuing IT fraud (left to right): Valerie Szczepanik, Paul Berger, Timothy England and Greg Faragasso

Software Tricks

In an ongoing saga, managers at theatrical producer Livent Inc. are accused of overstating profits by at least $59 million over eight years. They did it mainly by manipulating accounting software, the SEC charged in January.

Livent, which has financed big Broadway shows such as *The Phantom of the Opera*, allegedly tampered with the general ledger to hide losses from less-successful plays.

Toronto-based Livent wouldn't comment on the case. But according to the SEC, two senior controllers with computer know-how — Diane Winkfein and Grant Malcolm — were asked by Livent's executives to create a program that could override and rewrite invoices. The IT manager at the time was involved but wasn't charged, Berger said.

"This was hundreds, if not thousands, of invoices. The computer let them do it on a volume basis," said Greg Faragasso, an SEC lawyer also on the case.

Malcolm also kept a second set of books so that managers could track Livent's real financial shape, the SEC said.

The agency's civil complaint against Livent is on hold until March while a criminal case in New York state proceeds.

Though Winkfein and Malcolm settled their cases, the SEC can exact fines of up to $100,000 per person, per violation, in financial fraud cases.

IT can also get into trouble when the configuration of accounting software doesn't guard against potential crimes.

In a case against Material Sciences Corp., a specialty coatings maker in Elk Grove Village, Ill., the SEC in September rebuked the company for a computer system that "lacked safeguards" to prevent manual altering of the general ledger.

Sunrise Medical Inc. faced SEC lawyers when its Bio Clinic Corp. subsidiary faked financial reports to disguise sales and profit dips — and IT got involved in a cover-up.

Ontario, Calif.-based Bio Clinic's CEO worked with the company's chief financial officer to falsify revenue when sales of its orthopedic mattresses started to slow, said SEC lawyer Max Hathaway.

The scheme grew out of control, and the two executives coaxed IT manager Vicki Kranawetter and outside software consultant Luther Dale Robinson to hide it by reprogramming the accounting software, Hathaway said.

Double Entries

In one incident, the SEC found more than 400 invoices — worth $6 million — that had already been paid and added into the ledger a second time, Hathaway said. "That took over a week of programming and finding enough old invoices," he said. Kranawetter and Robinson didn't respond to requests for interviews.

Executives at parent company Sunrise in Carlsbad., Calif., who weren't accused of doing anything wrong, were chagrined that they hadn't spotted the misdeeds at the subsidiary. They cooperated with the SEC and formed a committee of outside directors to investigate Bio Clinic's accounting, and everyone involved was fired, Sunrise said in a statement.

The lesson for CIOs? Make sure that accounting systems at each subsidiary mesh properly with those at headquarters, so routine audits don't miss problems in the field, Hathaway said.

The corporate pecking order can perpetuate wrongdoing. Who wants to rat out the boss? IT directors often report to the chief financial officer or CEO — who, according to one study, committed 83% of the financial frauds prosecuted by the SEC between 1987 and 1997.

One problem is that IT people often perceive themselves as mere builders of computer systems, not as stewards of how the systems are used, said Jeff Smith, an expert in IT ethics at Wake Forest University in Winston-Salem, N.C.

And IT directors might not think that a small software change could have such big ramifications. "They may not focus on the fact that what they are doing is aiding and abetting the commission of a felony," said Toby J. F. Bishop, a partner at Arthur Andersen LLP's Business Fraud and Investigation Services unit in Chicago.

IT people are often blind to the pressures that can push executives to cook the books, said Dana Hermanson, an expert in corporate governance at Kennesaw State University in Kennesaw, Ga. He studied 200 fraud cases brought by the SEC from 1987 to 1997.

CIOs don't often get the same stock-option rewards as other top managers; therefore, they don't think much about how reporting a disappointing quarter to Wall Street can mean the loss of a big bonus or a big chunk of the company's value, Hermanson said.

"Reported earnings directly affect people's careers and wealth," he said. "If you haven't come up through a business background, you might not appreciate these incentives and the related potential for dishonesty." ◗

Book-Cooking

How IT can spot accounting fraud:

- If the accounting department runs a monthly or quarterly report many times, that may indicate that someone is playing with the numbers and trying to disguise it.
- Reports are generated by people not normally involved in such nitty-gritty work.
- Access controls are overridden. Check user logs.
- Accounting records aren't closed out on schedule at the end of the month or quarter.

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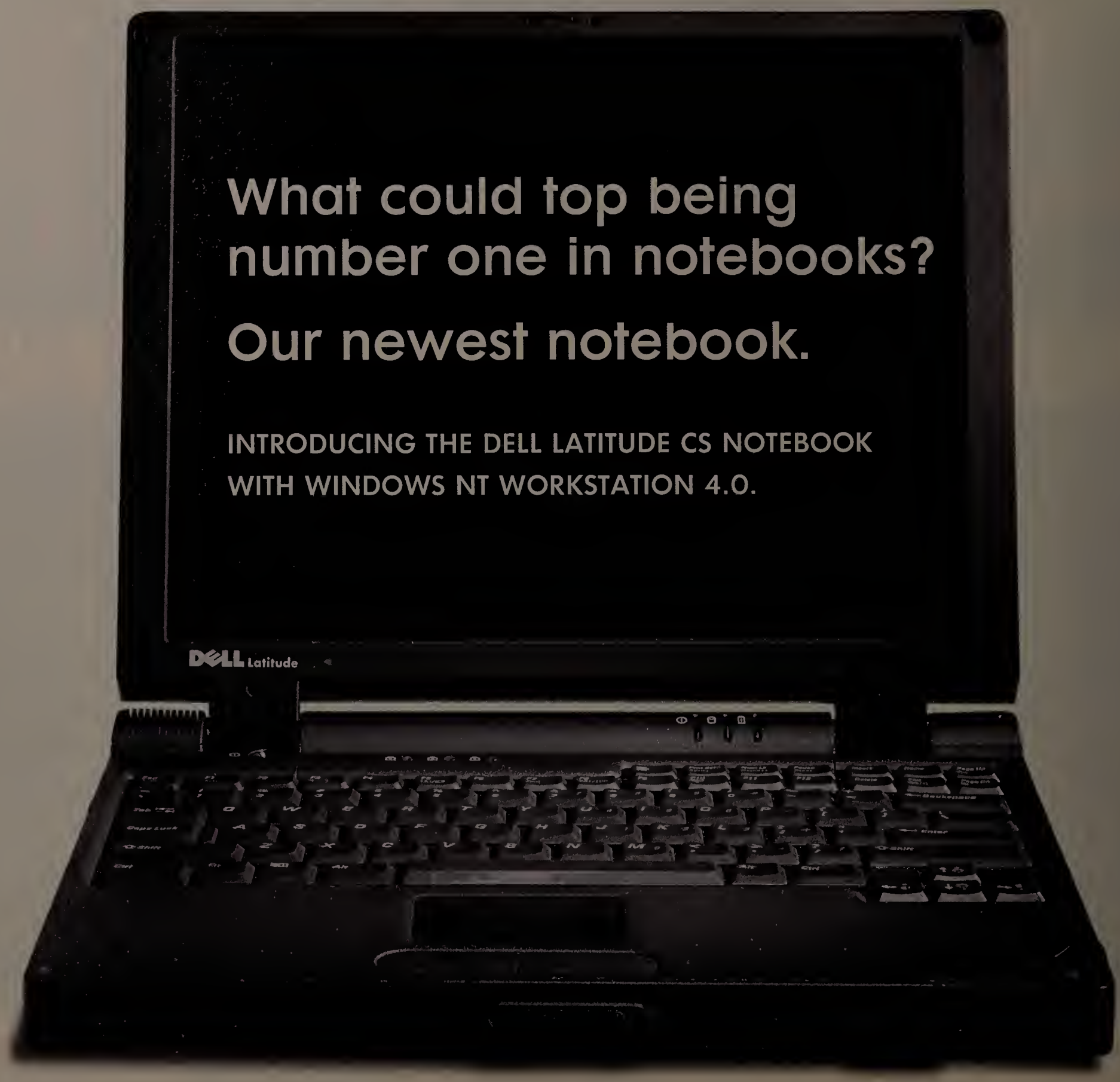

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Fleet Aims to Dodge Merger Potholes

Analysts believe bank will avoid missteps that have plagued Bank One, First Union

BY THOMAS HOFFMAN

THE TOP BRASS at FleetBoston Financial Corp. are well aware of the systems integration and other merger-related problems that have wounded industry rivals such as First Union Corp. and Bank One Corp.

Fleet, the nation's eighth-largest bank, is taking pages from those troubled mergers and from its own acquisition experience to make sure two things happen in the wake of its merger with BankBoston: that BankBoston customers see little, if any, change in how they interact with the bank, and that Fleet meets its $600 million cost-savings targets that Wall Street is expecting, including $200 million in information technology-related costs.

"We've very conscious of what's happened to First Union and Bank One," said Joseph Smialowski, vice chairman of technology and operations at FleetBoston, which resulted from the $16 billion merger between Fleet Bank and BankBoston Oct. 1.

Smialowski is referring to problems experienced by those two banks that have led Wall Street to slash their stock values over the past year.

Cautionary Tales

Those problems include First Union's ill-fated attempt at rapidly moving Corestates Financial Corp. customers to a new branch-banking environment following First Union's $16.6 billion acquisition of that company in April last year. Analysts said the move confused and irritated many Corestates customers and led to high customer attrition and lowered earnings.

Lagging revenue growth from former Corestates business contributed in another way. Charlotte, N.C.-based First Union in May lowered its 1999 earnings estimate from $4 per share to between $3.40 and $3.50 per share.

Bank One's inability to detect and react quickly to financial problems at First USA Bank N.A., the Wilmington, Del.-based credit-card giant it acquired in June 1997, forced Chicago-based Bank One last month to lower its 1999 profit forecast for the second time in three months [News, Nov. 15].

The new Fleet, said Smialowski, is taking steps to mitigate those types of risks, including the launch of an 80-point plan to preserve BankBoston customers' experiences with the bank.

For example, in the past, if a BankBoston customer had multiple accounts with the bank, that information was typically stovepiped among business units, making it difficult for call center agents and branch employees to understand a customer's full relationship with the bank. Now, Fleet is planning to link customer accounts across business units to help call center agents respond to requests more effectively, Smialowski added.

The bank also plans to closely monitor its systems integration efforts, scheduled to begin after lifting a Y2K systems freeze at the end of February. Of particular concern: watching out for anomalies in the processing of automatic-teller deposits or increases in customer complaints.

Fleet's executives have a successful acquisition history. Fleet's 1995 acquisition of Shawmut National Corp. and BankBoston's 1996 acquisition of BayBanks Inc. both resulted in customer attrition rates in the 5% to 10% range. That's the attrition rate experts expected, and it's much lower than what First Union experienced with Corestates, according to Ronald I. Mandle, an analyst at Sanford C. Bernstein & Co. in New York.

Given this track record, Wall Street is "highly confident" the bank will hit its $600 million annual cost savings goals beginning in 2001, said Kate Blecher, an analyst at Brown Brothers Harriman in New York.

MARC BERLOW

JOSEPH SMIALOWSKI, vice chairman of technology and operations at FleetBoston, is confident of Fleet's ability to merge with BankBoston

One-third of that target, or $200 million, is tied to technology and operations. Fleet expects those savings to result from its divestiture of 313 branches to Sovereign Bancorp in Wyomissing, Pa., under a $1.4 billion pretax deal, and a smattering of community banks throughout New England.

Other savings will stem from systems consolidation between the two banks. Smialowski said 30 of the 125 primary systems to be kept by the new Fleet are common to the banks, such as the check processing system the banks currently license from IBM.

Of the remaining 95 systems, 70% are Fleet-based, while 30% are being adopted from BankBoston, said Smialowski.

IT staff reduction will round out the remainder of the $200 million in annual savings (see related story, at right).

Merger Strategy

Fleet appears to be emulating the same type of in-market merger strategy that helped The Chase Manhattan Bank and Chemical Banking Corp. retain most of their customers and keep their operations running smoothly, said Bill Bradway, an analyst at Meridien Research Inc. in Newton, Mass.

Under Chase and Chemical's 1996 merger, the New York-based banks focused on the quality — and not the speed — of integrating their respective systems, an approach similar to the one Fleet is taking, said Bradway. Careful systems integration planning by Chase limited data processing problems — and customer angst — while customer attrition rates stayed below the 3% defection that banks quietly shoot for after a merger, Bradway said.

For its part, Fleet is dedicating 1 million staff-hours to systems integration and systems divestiture efforts, said Smialowski. He said he expects the bulk of the work to be completed next summer.

Smialowski is equally confident about Fleet's ability to merge with BankBoston. In the early part of the merger, Fleet Chairman and CEO Terrence Murray asked Smialowski whether the bank's systems integration challenges were relatively straightforward. Said Smialowski, "I think it is, but anything with a million hours will have its ups and downs."

Predicted IT Layoffs Haven't Hit Fleet – Yet

When the Fleet/BankBoston deal was announced last March, banking experts predicted that Fleet would cut up to 75% of BankBoston's 1,200-person IT staff once the systems integration work was completed.

At the time of the merger announcement, industry analysts described Fleet's merger style as "brutal" on the IT staffs of its acquired banks. Analysts projected that three quarters of BankBoston's IT department would get the ax during the first 18 months after the deal was completed.

And Michael Zucchini, Fleet's former vice chairman and chief technology officer, acknowledged at the time that staff cuts were likely but declined to discuss numbers [News, March 22].

The jury is still out. Even though the systems-integration work won't begin in earnest until late February – and won't be fully completed until the end of next year – Joseph Smialowski, FleetBoston vice chairman of technology and operations, said the turnover rate of the bank's IT departments has remained steady compared with the same time last year.

Smialowski, who previously headed BankBoston's IT group and then succeeded Zucchini, declined to disclose the turnover rates for the two IT departments.

That maps with what bank analysts have been hearing. "I'd say they're within plan," said Meridien Research's Bill Bradway.

Smialowski said he's not yet sure what percentage of the two banks' 10,000 technology and operations employees will be retained. Fleet is still involved in discussions with Sovereign Bancorp Inc. in Wyomissing, Pa., about how many IT professionals will be transferred to support the 278 branches Sovereign is buying.

Smialowski and his management team are currently evaluating all IT employees at the two banks. Final determinations about who will remain with Fleet should be completed by early February, he said.

– *Thomas Hoffman*

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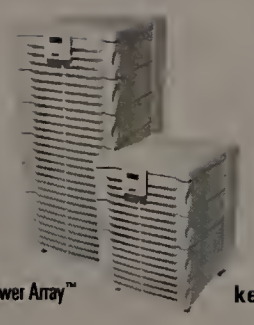

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IT Interest in Web Portals Tempered by Security Issues

BY MARK HALL
BERKELEY, CALIF.

IT came out in force at the Delphi Group Inc.'s Corporate Portals 1999 Conference here last week. Despite ringing endorsements for what portals offer information technology strategists, the clearest bells rang for the necessity of security in corporate portals.

The prospect of managing the user profiles, organizational roles, access rights and other information for 60,000 Du Pont Co. portal users unnerved Jim Wessely, a senior consultant at Du Pont research and development. "What scares me to death and gives me cold sweats at night is security," Wessely said.

"Security must be a process, not just an attribute" of portals, said Rich Armour, associate vice president of technology at the National Association of Securities Dealers Inc. (NASD) in Rockville, Md.

The parent company of Nasdaq Stock Market Inc. runs three portals among its myriad Web sites. Security is particularly acute at NASD because the portals serve different constituencies, from day traders to federal investigators, but they share a common, standards-based infrastructure and leverage overlapping resources. The portals do so while handling format requests from the 25 different browsers among the more than 25,000 users.

IT staff at NASD constantly monitors service packs and software patches. "If you have a known security hole in your system, [crackers] will find it," Armour said.

Health Care Priority

At Foundation Healthcare Systems Inc. in Woodland Hills, Calif., management is already sold on the idea of rolling out a portal for its employees, network of health maintenance organizations and suppliers. Trying to integrate the disparate legacy systems from acquired companies by enhancing each system wouldn't be worthwhile, said Erin Mendez, vice president of IT.

Mendez said she sees a portal as way of "bringing sanity" to her legacy environment. In health care, she said, security is a priority, and the industry is getting ready to confront new federal regulations on how it must protect the privacy of patient information. Any company offering a portal product to health care has to take a much higher level of security into account, Mendez said.

Despite losing sleep over security, Wessely is heading up a portal implementation project for three business groups inside Du Pont. He said cost savings of portal technology have yet to be proved but that's not its real value. "A good portal gives people some extra time by getting information to them quickly, which they can turn into knowledge," Wessely said.

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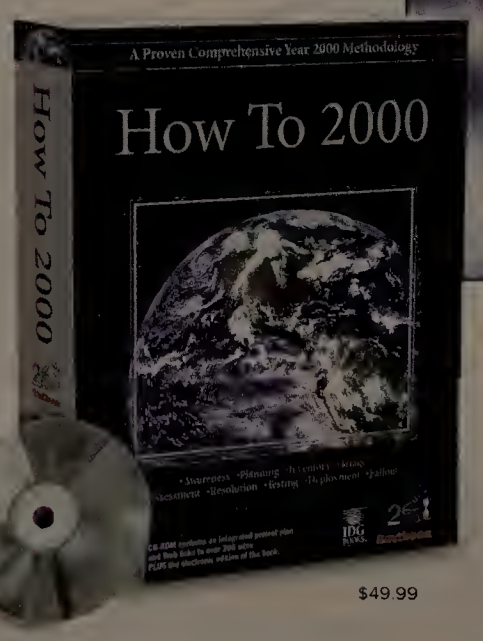

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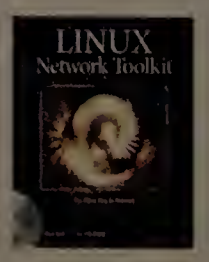

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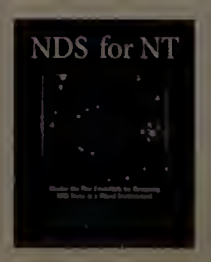

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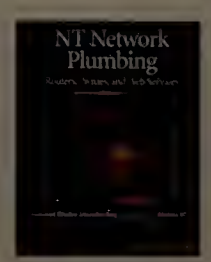

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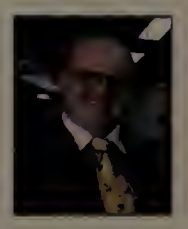

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* Netcraft Survey (September 1999)

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BRIEFS

PC Sales to Grow 17%

Worldwide PC shipments will grow 17% in the fourth quarter compared with the same period last year, despite the effects of the Taiwan earthquake on chip supplies and the slowdown in corporate purchases due to year 2000 concerns, according to research by International Data Corp. in Framingham, Mass. For the year, shipments are expected to grow 23.5% above 1998 levels in the U.S.

Dell to Install Linux

Dell Computer Corp. in Round Rock, Texas, will factory-install Red Hat Linux on all current and future server models, expanding earlier commitments to the platform. Red Hat Inc.'s joint announcement with Dell last week adds little to earlier deals between both companies, analysts said, but investors sent stock of Durham, N.C.-based Red Hat soaring to $232.125 per share the day of the announcement, up $31.13.

Baan Gets More Cash

Baan Co. has received another $200 million in funding from Fletcher International Ltd., bringing the total amount invested by Fletcher to $425 million since Fletcher first finalized an equity investment agreement with the Dutch-American software vendor in December 1998.

Stake in Digital Island

Sun Microsystems Inc. will invest an undisclosed amount to buy an equity stake in San Francisco-based network services provider Digital Island Inc. Inktomi Corp., a San Mateo, Calif., vendor of content-delivery software, said it's also expanding its stake in Digital Island. Meanwhile, Digital Island will spend up to $150 million to install Sun and Inktomi technology.

PSINet Expands Reach

Herndon, Va.-based PSINet Inc. said last week it will open 21 global Web-hosting centers by the end of next year, and that it has spent $15 million since October equipping five centers with technology from EMC Corp. in Hopkinton, Mass. PSINet will use EMC's Enterprise Storage systems, networks and software.

AT&T Reorg Stresses Services, New Capital

Spins off wireless unit, consolidates services

BY JAMES COPE

With long-distance competition from local telecommunications companies looming in the distance and visions of a Sprint Corp./MCI WorldCom Inc. merger filling the rearview mirror, AT&T Corp. last week outlined its strategy for bolstering business through realignment and redirection of its customer service groups.

Headlining AT&T's announcements was confirmation that it would form a new company called AT&T Wireless Services in Redmond, Wash., for which a tracking stock will be issued next year.

"AT&T is probably looking at the lofty multiples attained by Yahoo and others, and is salivating at the prospect of higher stock values for the new AT&T Wireless tracking shares to be issued as currency for new acquisitions," said analyst Albert Nekimken at Input in Vienna, Va. "All indications are that wireless will boom."

Elsewhere in the company, all business-related services will be consolidated under AT&T Business Services, which will be headed by Richard R. Roscitt, 48, the company said. Roscitt currently heads up AT&T Solutions Inc. in Basking Ridge, N.J.

Reporting to Roscitt will be Kathleen Earley, 47, who was named president of the newly formed AT&T Data. This unit will offer data and managed networking services, including the networking consulting services now delivered through the AT&T Solutions group, according to the company.

"Putting all data activity under one organization is a great concept," said Lisa Pierce, an analyst at Giga Information Group Inc. in Cambridge, Mass. "It's the best way to meet customer needs, and it's the right thing to do."

However, Pierce wasn't so complimentary of comments from AT&T Chairman C. Michael Armstrong, which she said she felt were aimed more toward boosting stock prices than supporting customers.

Armstrong said, "We've got a full-court press under way to accelerate revenue growth and fast-forward AT&T's transformation into a leading global communications and information company. No other company outside of financial services currently matches that level of performance."

On the infrastructure front, AT&T made it clear that more fiber is better. The company expects to spend $1 billion over the next two years to expand its optical network and will install 2,900 miles of cable on its own and another 10,500 miles in conjunction with CapRock Communications Corp. in Dallas, PF.Net in Washougal, Wash., and Touch America Inc. in Butte, Montana.

AT&T said the cable, which will initially support the OC-192 standard for handling traffic at 10G bit/sec., will also be capable of OC-768 speeds of up to 40G bit/sec. ◗

New Strategies By AT&T

- Business-related activities will be consolidated under AT&T Business Services
- AT&T Data, a new unit under Business Services, will offer IP, data and managed networking to businesses
- Will expand fiber-optic network via contracts with three other companies
- Will end exclusive relationship with Excite@Home, which provides Internet services to cable TV customers

MORE THIS ISSUE

For more information on AT&T's spin-off plans, see page 83.

Microsoft, Ericsson Partner on Wireless

Agreement will spur wireless Net's growth, analyst says

BY MATT HAMBLEN

Microsoft Corp. last week announced two alliances with wireless leader Ericsson Inc., including plans for a joint company that will market and deliver mobile e-mail products to network operators.

The two companies also announced a strategic partnership to develop and market wireless Internet-based systems using any device. In that partnership, Ericsson will provide its Wireless Application Protocol (WAP) software to Microsoft, and Ericsson will adopt a new Microsoft wireless browser, to be called Mobile Explorer, for use in some Internet-enabled smart phones.

> This is one more way for Microsoft to get into a competitive market.
>
> ALAN REITER, ANALYST, WIRELESS INTERNET AND MOBILE COMPUTING

Ericsson will own the majority of the joint company, which will focus on building and deploying e-mail products using Microsoft Windows NT Server and Exchange and Ericsson Internet technology.

Wireless industry analyst Alan Reiter at Wireless Internet and Mobile Computing in Chevy Chase, Md., viewed the announcements as "one more piece in the puzzle" of how the wireless Internet world will develop.

Reiter said the news underscores the difficulty Microsoft has had in bringing wireless Internet to the corporate world through Wireless Knowledge, a Microsoft partnership announced a year ago with Qualcomm Inc. in San Diego.

Some executives have left Wireless Knowledge, but Microsoft obviously sees the importance of wireless in its future and resorted to working with a leader like Ericsson, Reiter said.

Stockholm-based Ericsson and Nokia Corp. in Finland are the leaders in developing hardware and software for wireless Internet access, with Motorola Inc. in Schaumburg, Ill., close behind, he said.

"This is one more way for Microsoft to get into a competitive market," Reiter said. In addition to developing WAP, Ericsson and Microsoft also plan to work on the development of Bluetooth, a short-distance wireless technology for connecting mobile phones to laptops or laptops to printers, for example.

Analyst David Hayden at Mobile Insights Inc. in Mountain View, Calif., said Microsoft's pledge to the WAP standard is key to the announcement.

Given the slow start with Wireless Knowledge, Microsoft has needed to partner with a large handset manufacturer to be able to "really get into a dogfight" with competitors, such as Phone.com Inc. in Redwood City, Calif. Phone.com is selling WAP servers to network providers and WAP browsers to handset manufacturers, and it's involved with new Internet-enabled phones being sold by Sprint Corp. in Kansas City, Mo., Hayden said. ◗

Was it fear that drove 9 of the top 10 Internet companies to Network Appliance?

Call it fear. Call it prudence. Or just call it common sense.

Either way, one thing's sure. Those industry leaders know what happens when mission-critical data's unavailable. Revenues stop. Potential customers vanish. Reputations sour. In short, a single—even brief—data outage can plunge any of them waist-deep into one very ugly situation.

Now, a little logic. Surely, you don't need more system complexity, more potential problems. So a sensible response to the data-outage threat should be as simple, reliable and easily managed as—well, an appliance. Which is exactly what drew those companies to Network Appliance™ storage and Internet caching solutions. That, and 99.99+% uptime. Plus the speed they add to data delivery. Not to mention the ability to recover lost or corrupted data in minutes instead of hours or days.

OK, maybe you think the data-outage menace shouldn't really fill hearts with terror. But then again, being temporarily "out of business" isn't appealing, either. So why not look into what some very smart companies view as the ultimate "risk-avoidance" system? Visit us at www.netapp.com/internet/. You'll find all the details you'll want. And absolutely nothing to fear.

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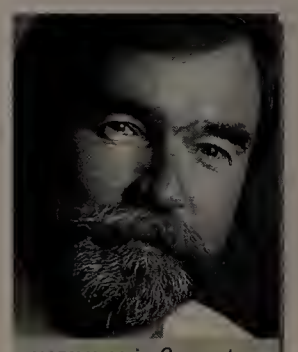
MARK HALL

WTO, EU and you

THE WORLD TRADE ORGANIZATION innocently claims that it only wants to foster globalization through the establishment of free-trade policies. Judging from the recent ruckus in Seattle, it seems many people oppose this ideal, probably because they know that the WTO does much more than wrestle with arcane import tariffs and government subsidies.

For one thing, it seems hell-bent on undermining the Internet.

Under sustained pressure from the European Union, the WTO is considering taxing three kinds of Internet transactions: 1) online content that is downloaded, 2) goods ordered over the Web and "delivered by conventional means" and 3) network services. In effect, everything. The WTO would levy tariffs through its General Agreement on Trade in Services power, which "does not distinguish between technological means of delivery." In other words, if it exists, it's taxable.



MARK HALL is *Computerworld*'s West Coast bureau chief. You can contact him at **mark_hall@computerworld.com.**

Although the WTO's "current practice of not imposing custom duties on electronic commerce" still stands, the "working programme" on e-commerce seems tilted in the direction of taxing Internet commerce. EU Trade Commissioner Pascal Levy, an influential voice inside the WTO, is doing his best to end the current tax-free practice. And he has his followers. For example, before ending his term as the WTO's director general, Renato Ruggerio expressed his view that Web sales weren't different from any other shopping transaction and therefore should be taxed.

It's possible that the protesters in Seattle, who were mostly concerned with environmental and labor issues, have given the Internet a reprieve. The WTO is looking for all the friends it can get now and doesn't want to push e-commerce vendors and suppliers out into the streets along with its other enemies.

But don't be lulled into complacency. The EU is determined to make the WTO change its position. And with little opposition outside the U.S., it could easily prevail.

Today, IT doesn't have to concern itself with charging, gathering and remitting online taxes to various collection agencies. If the EU and WTO pals get their way, such programs will need to be added to your to-do list early in the next century. ◗

Other opinions on Internet taxation are on page 34.

ALLAN E. ALTER

A lo-o-o-ong look ahead at the future of management

IF YOU CAN'T take the long view at the start of a new millennium or a new job, when can you? And by sheer coincidence, both times have come for me.

While I will remain a *Computerworld* columnist, I am moving on, after six happy years on the staff of this great newspaper, to become editor in chief of the *MIT Sloan Management Review*. So while the IT world is focused on Y2K and e-commerce, management is very much on my mind. How will this protean profession change in the next century?

Management practices that were commonplace decades ago are extinct today. Chances are, the boss isn't making you wear a suit and tie. He isn't grading your ability to take orders without question, firing workers who talk on the job or carrying out a time-and-motion study. Instead, he may be a she. And she's judging you on the ideas your staff generates or the progress you've made instituting knowledge management.

ALLAN E. ALTER, is *Computerworld*'s columns editor and department editor, Managing. Contact him at **allan_alter@yahoo.com.**

So which of today's management practices will be old hat in 2100? What new ones will emerge? What will tomorrow's executives grasp that we are blind to today?

Here's my 2 cents' worth:

■ The next recession will make us rethink the growth-centric, new-age management principles now in vogue. Today's dot-com entrepreneurs and new economy gurus are blossoming in the warmth of one of the longest economic expansions in U.S. history. Only when times get tough will their ideas be tested.

■ We will reinvent how compensation and advancement work. Peter Drucker was on to something in his October *Atlantic Monthly* article: When growth slows, knowledge workers won't be content with performance raises and stock options; they will demand a say in running companies. I suspect they'll want less-risky forms of compensation, such as guaranteed contracts, after the next recession.

■ How we manage will be affected by changes in culture, especially political culture. For example, If Hitler had won World War II, we'd be reading articles with titles like "Supply-Chain Management and the 'Führer Principle.' " But Hitler lost, and the children of the victors — shaped by the '60s, the Reagan years and the individualistic culture both eras had in common — are shaping

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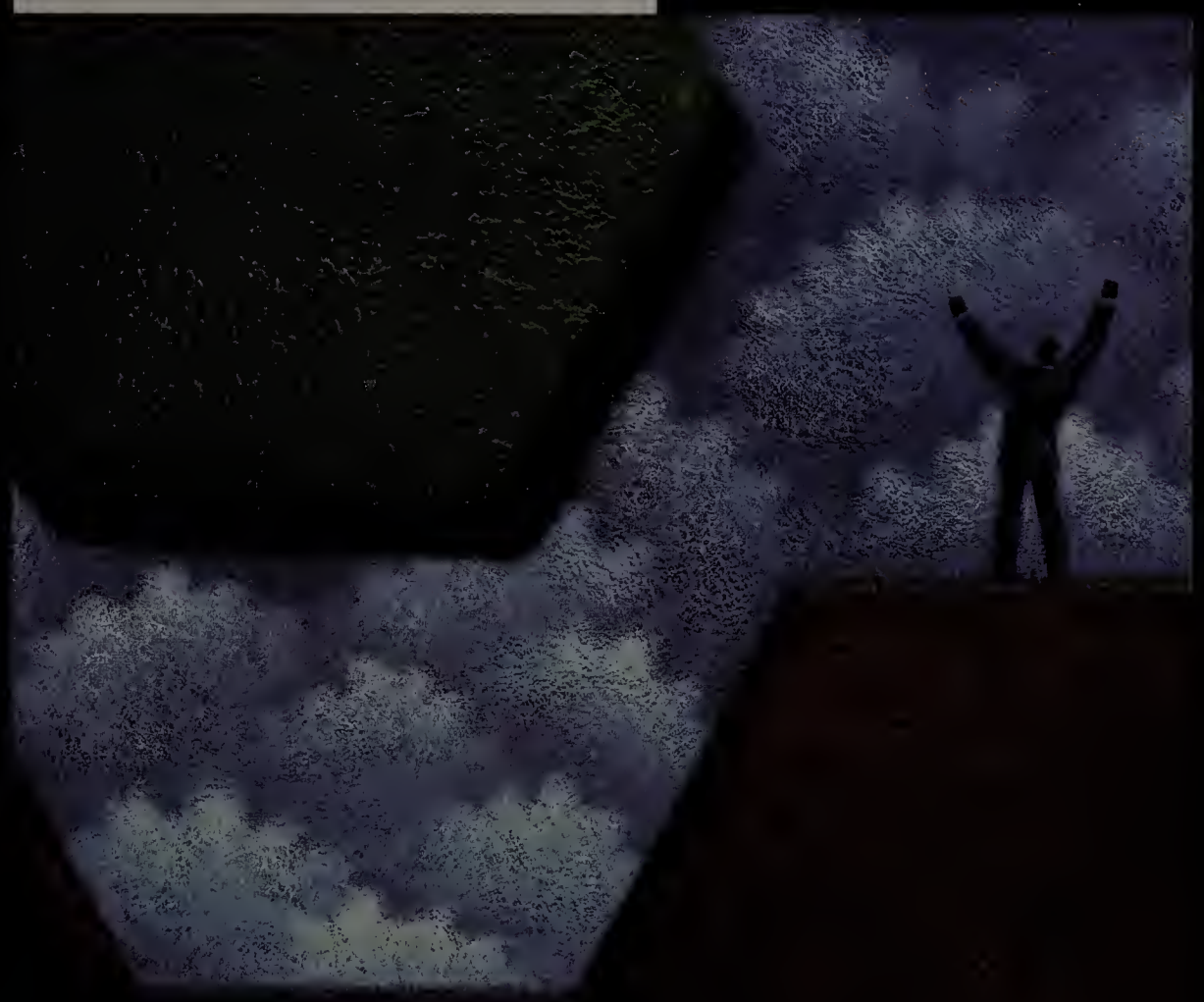

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NETWORKING:

Making Better Business Decisions

By
Jun Li,
Gartner Group

It was said we entered an information era long ago, but it was only recently that people began to look seriously at managing their data to meet ever-stringent, business-critical requirements. With new technologies emerging, such as document imaging, it isn't only existing information (whether in the form of paper, audio or video) that must be converted into the ubiquitous digitized form, but also the huge amount of new information that businesses worldwide are generating every second. To cope with this data explosion, we need new technology. From server-attached storage devices to network-attached storage to the storage-area networks of today, storage technology keeps developing and expanding.

A Brief Retrospective

The concept of system-managed storage (SMS) for managing storage resources has been widely adopted by many data centers since IBM introduced it in 1989. Distributed storage management presents the significant challenge of efficiently managing storage in a rapidly growing environment. Enterprises find themselves struggling to implement a comprehensive solution that meets service-level requirements and satisfies business objectives.

Enterprises want to manage business-critical information effectively across mainframe, midrange, Unix and Windows NT platforms. Although the cost and type of storage management varies, user requirements are similar in all environments.

The possibility of system-managed storage rests with the synergy of hardware and software functionality combined with policies, practices and administration procedures. That approach initially focused on solving storage management issues within the MVS data center. But enterprises typically have at least the same amount of storage located outside the data center as inside. Furthermore, the demand for network-attached storage (NAS) and field worker support has risen rapidly. Given the need for automated methods to keep both centralized and distributed storage in a manageable state, the system-managed storage must become pliable enough to accommodate enterprise storage management needs.

Jun Li is the leading analyst in storage management software research at Gartner Group/ Decision Drivers Software Infrastructure Group. Prior to that position, Li was an analyst in the data networking group at Gartner. Li joined Gartner in 1998. He also worked for World Bank as a policy analyst for two years. Li builds and maintains decision support models to assist clients in selecting strategic Storage Management Software. He can be reached at jun.li@gartner.com.

The Market

From 1997 to 1998, the overall storage management software market grew 30.9%. If it continues at that rate, the market would reach $6.6 billion by 2003, with a compound annual growth rate of 20.6%. New technologies and an expanded interest in software by traditionally hardware-focused vendors fueled growth in the storage management software market. New segments have formed around data replication products and SANs and device administration tools. In addition, new products in media and library management and in the hierarchical storage management (HSM) areas have highlighted a need for focus on these segments as well.

Distributed computing initiatives are creating storage environments that are diverse in terms of platform type, size and location. Specialized storage availability management tools are beginning to emerge, and integration with network and systems management tools is required. Storage hardware vendors are differentiating their products by either embedding or selling value-added storage management software. Initial SANs and intelligent storage hardware products are appearing on the market now.

During the past three years, SANs have risen from relative obscurity to offer a new vision for managing the exploding growth in storage. Software tools are now being challenged to evolve to address this new topology even as they continue to struggle to provide support for traditional server NAS environments. Growth of 24/7 mission-critical applications and databases is driving the deployment of recovery strategies that include remote-copy technologies.

Snapshot products are also being used to shorten the backup window. As the challenges increase, vendors continue to merge to form larger companies to address the engineering, marketing and services requirements of corporate customers with complex storage topologies. New vendors continue to emerge with innovative solutions that are first proved in the market — then the company is acquired. The storage management software market remains highly volatile, as demonstrated by the following partial list of mergers and acquisitions that occurred in the first half of 1999:

- Sentryl Storage Management Software was acquired by Amdahl Corp. (March 29, 1999)
- BMC Software Inc. acquired Boole & Babbage Inc. (March 30, 1999)
- Intelliguard Corp. was acquired by Legato Systems Inc. (April 1, 1999)
- BMC acquired New Dimension (April 14, 1999)
- Spectra Logic Corp.'s Storage Management Software business was acquired by Sterling Software Inc. (April 16, 1999)
- Fulltime Software (formerly Qualix Group) was acquired by Legato (April 19, 1999)
- Hewlett-Packard Co. announced intent to acquire Transoft Networks Inc. (May 3, 1999)
- TeleBackup Systems was acquired by Veritas Software Corp. (May 26, 1999)
- Seagate Software's Network and Storage Management Group was acquired by Veritas (May 27, 1999)
- Platinum Technology International Inc. was acquired by Computer Associates Inc. (June 4, 1999)

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Requirement Component	User Benefit
Hierarchical Storage Management	Automated Data [illegible]
Hot Database Backup	Data Availability
Disaster Recovery	Business Process Re[illegible]
Centralized Administrative Control	Expense Reduction
Multitasking	Processing Throughput
File Batching	Optimize Network Usage
Data Reduction Techniques	Minimize Network Traffic
Catalog Management	Processing Throughput
Large Number of Files Handling	Data Protection
Large Database Handling	Data Availability
Automated Set Procedures	Ease of Installation and Testing
Technical Support Structure	Problem Determination

- Legato acquired Vinca Corp. (Aug. 2, 1999)
- Sterling Software announced intent to acquire CoreData (July 30, 1999)

The Technology

The storage management environment in most organizations is getting more complicated. To gain an edge, these organizations began to deploy newer, larger mission-critical applications, such as those related to e-business and enterprise resource planning. These applications usually run on multiple platforms (Unix, NT or NetWare) at different locations. A huge challenge for today's IT professionals has been to achieve reliable backup and recovery for various applications within an acceptable time frame in a fragmented environment, especially when considering already stringent bandwidth and widely dispersed servers.

Storage management software vendors are developing new products to meet the ever-growing demand of the end users. The different marketing approaches from the vendors often seem confusing and result in difficulty finding the best overall enterprise storage management software solution. The table above summarizes some of the requirement components and resulting user benefits.

Users choosing a storage management software solution should strive for a minimal number of products that satisfy enterprise business requirements. One such requirement is disaster recovery.

Disaster Recovery

Increased dependence on IT has led to increased economic vulnerabilities associated with business continuity and disaster planning. The disaster recovery window in most enterprises has shrunk drastically to no more than one day, if not totally disappeared. To adapt to this new situation, enterprises are increasingly referring to data replication technology for help, such as mirroring and shadowing, which is traditionally used for high availability. It is by no means an easy task to make a choice between the numerous products on the market with different implementation options. Plus, data replication solutions are usually specific to a database, file system, operating system or disk subsystem, which implies that enterprises often must use multiple solutions to protect their critical data.

The threat of lost economic viability in the event of a disaster will drive penetration of data replication technologies. Enterprises with outdated business impact assessments and business continuity plans should update them to reflect the business impact in the event of a disaster and the requirements for recovery of business processes. Where short recovery times are required, enterprises should evaluate data replication technologies.

Disaster recovery time could be greatly reduced by using data replication technology (for example, asynchronous shadowing or synchronous mirroring). Depending on the extent to which this technology is implemented, recovery time could drop from one to three days to less than 24 hours, often to between 20 minutes and four hours and even shorter when implementing hot standby application

environments. Although data replication offers the potential for short recovery, there is also a potential for data corruption. To avoid data corruption, data replication shouldn't be used as a substitute for the backup and offsite storage process. Besides, enterprises should include procedures in their disaster recovery plans that examine data integrity of the replica prior to resuming production operations. For time-critical applications, enterprises should consider maintaining multiple point-in-time backups and electronic journaling. Furthermore, enterprises should have a design for replication architecture that includes a step that enables disaster recovery testing without disrupting production applications or exposing them to a loss of protection during testing.

Hierarchical Storage Management, or HSM

One technology to look at is HSM. HSM products were previously part of a LAN solution. The software and systems were expensive, complex and poorly integrated with other storage and data management software. While many of the integration issues have been addressed, the high implementation cost of an HSM system combined with a lack of understanding of the benefits of HSM remain obstacles for most enterprises.

The benefits of an HSM system can be expressed in the data management labor savings that can be realized by most enterprises. Most users have seen messages informing them that they are "out of disk space." The user then asks the help desk to attach another disk to the server as soon as possible. The relative low cost of disk drives seems to make this a financially viable methodology – but not a user-satisfying one.

Are we really "out of disk space"? In fact 70% to 80% of data on distributed platforms is inactive – meaning it isn't currently used nor is it likely to ever be accessed again. An HSM system will identify this inactive data and move it to near-line storage based on user-defined thresholds and rules. In addition, even if the systems administrator has identified the inactive data, manually moving it is time-consuming. An HSM system also automates the retrieval process, which isn't provided by archiving. To users, the data always appears to be on the primary storage medium (the disks), but all that actually remains on the primary medium is a pointer to the location of the data on the near-line storage media. Users can access the migrated data in the normal fashion via applications or utilities, and the HSM system migrates the data back to the primary storage medium and provides access for the user.

But HSM isn't a substitute for backup software. It is a complicated process requiring a long-term maintenance commitment. A poorly designed or implemented HSM process can degrade application availability through data loss and data access delays. Central IT organizations shouldn't pursue a large-scale HSM implementation for general-purpose file servers until backup and recovery processes are automated and reliable and the storage management infrastructure is stable and recoverable.

Storage-Area Networks, or SANs

What is a SAN? Gartner Group defines a SAN as a two-

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tier model: The first tier, the storage plumbing tier, provides connectivity among nodes in a network fashion and transports device-oriented commands and status. At least one storage node must be connected to this network; the second tier, the software tier, uses software to provide value-added services that operate over the first tier.

Quite a few vendors in the storage market have announced that they are "SAN ready." But the first question users should ask is, "Is SAN ready?" SANs certainly have benefits. What's questionable is whether these benefits are deliverable as a solution. The primary SANs benefit is enabling server access to a centralized pool of storage, thus providing administration with greater flexibility in realigning disk space to the servers that need it. This is in contrast to a fixed server/storage model, where excess disk capacity can't easily be used elsewhere and additional disk space must be added and installed independently for each server.

Another SANs benefit actually derives from the first one. Since all storage is centralized, it takes less time to physically locate storage-related problems. However, SANs offer limited benefits today when it comes to lowering cost of management. Although SANs enable disk capacity pooling, capacity management still occurs on a server-by-server basis. This includes mapping of logical to physical devices and the definition and management of file systems. Applications don't see a common pool of storage.

To realize all the claimed benefits of SANs, improvements must also be made in other components of a storage network, including servers, operating systems, file systems and other related systems software that work together to permit better performance and manageability of business applications. SANs, therefore, won't provide all the benefits by themselves.

Interoperability is another barrier when implementing SANs. Those vendors that claim they are "SAN ready" are actually able to implement only a partial SAN on a proprietary basis. There is no universally agreed-upon SAN standard yet. If users do want to install SAN, it is recommended that they try it in a homogeneous computing environment first — and on a small scale. Many promised SAN solutions are in fact still in the initial development stage, interoperability with current storage management products isn't guaranteed, and IT organizations evaluating server and SAN technology should carefully investigate the integration plans of prospective storage hardware and software vendors. Users should also evaluate the vendors' integrated vision for storage, servers, operating systems and systems software.

Business Impact

Technology is important not by itself, but because of its impact on business. Therefore, IT management should align with business management.

System availability is key, yet more than one out of four organizations had a disruption in computer systems use in the past five years. The length of disruption varies. Thirty-three percent experienced four hours or fewer, 18% five to eight hours; 20% nine to 24 hours; and 24% more than 24 hours. As a percentage of the IT budget, disaster recovery funding has increased from a little less than 7% in 1997 to

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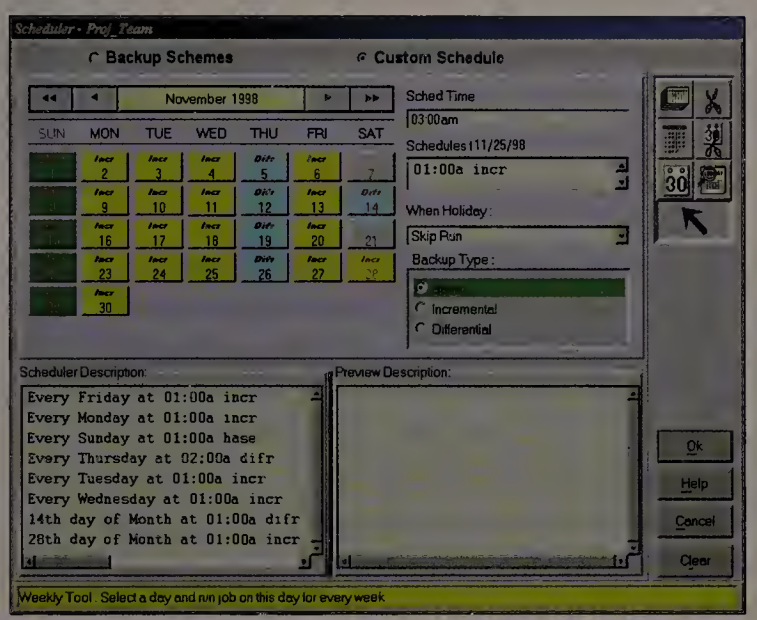

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more than 8% in 1999. Until recently, the IT organization took full responsibility for disaster recovery. Now, whether due to the unfortunate frequency of natural disasters, increased reliance on systems to support the day-to-day business functions, greater emphasis on "data" being valued as a corporate asset or some combination of these ideas and more, the disaster recovery issue has become a business resumption concern — and has become everyone's job.

While many data centers have some sort of backup plan in place, we believe that there is still plenty of room for improvement. Because the scope of recovery encompasses not only the mainframe area, but also includes centralized servers and midrange platforms, there needs to be an increased focus on the processes surrounding this critical activity.

Choosing the right technology to improve business continuity requires an understanding of the direct and indirect costs of business system downtime. The availability of various platforms is outlined in the chart on page 13.

Most decisions today are made based solely on acquisition price, marketing claims and the desire for "state-of-the-art" technologies. Surprisingly, little attention is being paid to understanding the impact of new or altered technologies on business systems and processes, let alone legacy systems. Increased complexity leads to increased downtime.

This situation becomes even worse when considering the availability aspect of the back-end devices that are truly running the business. Only a handful of user organizations to date have taken even an initial stab at the cost to the organization of unavailability. System availability is key to success in emerging global, electronic marketplaces. The future is 24/7 for most firms.

The recovery windows for ERP installations, such as SAP, Oracle applications and Baan, following a disaster are shrinking. That has resulted in enterprises either improving the traditional recovery process or moving toward continuous data availability at the disaster site. Gartner Group research shows that most enterprises using SAP currently plan on the application recovering in 24 to 48 hours. By 2000, the window will further shrink to less than 24 hours. To achieve this goal, enterprises can use two approaches: Build fast recovery into the systems design by minimizing the recovery time during each phase; and, if the recovery time is still outside the window, implement the continuous data availability techniques, such as database replication, shadowing and mirroring, which will reduce recovery time to between 30 minutes and several hours.

To better manage a business continuity plan from a storage management perspective, enterprises should also pay attention to the following best practices:

- Include the customer in the resumption planning process. This helps the IT organization determine both the effort involved in supporting those needs and whether other solutions exist that can achieve a similar level of recovery but at a lower cost to the organization.
- Complete an annual review of contingency capacity requirements and implement rigorous testing processes. As the environment grows and changes, appropriate

Platform	Outages *(per server, per year)*
S/390 (sysplexed)	10 minutes
Tandem	1.7 hours
AS/400	5.2 hours
S/390 (nonsysplexed)	8.9 hours
VAX	18.9 hours
Unix (all)	23.6 hours
Windows NT	224.5 hours

Source: GartnerMeasurement

adjustments must be made to the plan to support that growth. In conjunction with that growth, adequate testing must be performed to validate plan objectives and guidelines. Testing should include not just the systems but the customer applications as well. A minimum of two tests a year is advisable — many organizations go through three or four recovery exercises annually.

• Use aggressive negotiation strategies with vendors when acquiring contracted support. Many organizations, when renewing their contracts, have been able to sign agreements that either include increased capacity at the same cost or the same capacity at a lower cost. Vendor competition may result in lower costs, but keep in mind how critical the service being purchased is. It isn't necessarily in the best interest of the company to change vendors strictly to achieve cost savings if the current provider has successfully met the needs of the organization.

A recent Gartner Group/Decision Drivers Inc. survey revealed that the average enterprise software selection takes anywhere from eight to 24 months to complete, is rife with internal political agendas and typically is completed without a structured process for evaluation. Typical methods include rules of thumb, vendor-driven evaluations, gut feeling or management directive. The coupling of a complicated, costly decision, internal political agendas and a lack of structure to the selection process is a guarantee of disaster. Understanding the scope of the project at the outset helps the project team set achievable goals and facilitate management buy-in.

One of the most important points in the application selection process is identifying mandatory requirements and strong preferences in order to focus the evaluation on the most meaningful vendors and products. Given that there are more and more vendors selling storage management solutions, a failure to identify enough mandatory requirements and strong preferences can lead to having a list of vendors/products that is too long (ideally, the list should be no more than five to six candidates). However, being too stringent on functionality requirements can lead to eliminating what may prove the best overall technology when considerations such as cost, service and support, vision and ability to execute are factored in.

The selection process can be broken down into phases:

- Internal needs assessment
- Vendor analysis and evaluation
- Negotiation and selection

The first phase of the overall selection process is internal needs assessment. The fundamental success of the decision is grounded in this phase, in which the project team is selected, the selection processes and methodologies are chosen and the requirements definition is created. An inconsistent approach or inattention to detail within any one of these critical tasks can irreparably jeopardize an otherwise flawless selection.

The first step in the selection process is choosing the members of the project team, whose goal is to develop a business justification for the selection, evaluate the vendors in the marketplace and ultimately select a vendor. The team must then justify that decision to management and negotiate a contract.

The second major section of the selection process is the vendor analysis phase, in which vendor responses are scored, validated, evaluated relative to one another, and a shortlist of two to three vendors is created.

The vendor validation process involves gathering additional sources of information to ensure the accuracy of responses to the RFP. Much like a presidential poll, project teams take a sample portion of the RFP (at most 10%) and gather data on the vendor from additional sources to create an inconsistency index for each vendor. For example, of 200 questions polled, discrepancies appear on 30 questions, for an inconsistency index of 15%. Sources can include industry analysts, reference accounts, informal networks, trade magazines and online informational sources. Typically, project teams delve into further investigation when research reveals an inconsistency of more than 10%. Additional data points and/or an expansion of the questions asked can lead to further validation of inconsistencies or pinpoint reasons for the initial variation.

The final phase of the selection process is negotiation and selection. Within this section, the project team typically goes through an initial negotiation with the vendor finalists (two, at most three, vendors), uses those initial quotes and the information gained from the vendor analysis phase of the process to ultimately select a vendor of choice. Once project team members have selected a vendor, they must facilitate management buy-in for the selected vendor. This is typically done through a management report and presentation. Gartner Group/Decision Drivers has found that the three most important factors in easing management acceptance of the project team's recommendation are a consistent process, a documented methodology and validated data used throughout the entirety of the selection.

What follows are the key factors for successful decision-making:

- Don't take shortcuts during the IT applications selection process.
- Distinguish tactical from strategic purchases of IT applications.
- Prepare a detailed RFP/RFI looking at all elements of applications selection.
- Don't depend entirely on vendors or consultants during the selection and installation process.
- Bargain fairly with vendors of choice.
- Match the vision of the vendor with that of the user.
- Don't accept standard software licensing agreements.
- Start initial implementations with low-visibility pilots and facilities.
- Get everything in writing to avoid misunderstandings.
- Create financial penalties or rewards for vendors in the contract.

Bleeding-edge technology gives you the edge in competing with your rivals. But it can also make you bleed if you don't fully understand all its advantages and disadvantages before embracing it. You need to understand this in the context of your business, as well as in connection with the vendor that provides it. Acquisition of a new technology in this environment isn't an easy job. A rigorous, structured selection methodology will help you make a better, faster and more cost-effective decision and facilitate your management buy-in. ◗

Q&A *With Sheila Childs*

Sheila Childs is a product manager at BMC Software and a member of the Storage Networking Industry Association (SNIA). Childs spoke recently with *Computerworld*'s Custom Publishing Group.

Q: How long have you been a part of the storage industry?
Childs: I've been working for BMC for a few years now and have been doing backup and recovery-related work mostly in legacy environments for the past 10 years. I came to BMC to continue in that vein and got interested in storage-area networks and storage networking in particular about two years ago. I started following the industry and participating in SNIA and some other organizations

Q: As a veteran in the industry, what changes have you witnessed over the years?
Childs: There's a lot of momentum behind storage networking, in particular from the vendors. Some people with a tremendous mainframe background will tell you that this type of technology has been around forever. And over the past couple years, the distributed systems world has woken up and seen a lot of the benefits that can be provided by sharing and consolidating storage. The vendors are building solutions and trying to push them forward as quickly as they can because they see the tremendous potential. Users seem a little bit slower to adopt, very cautiously watching what's going on.

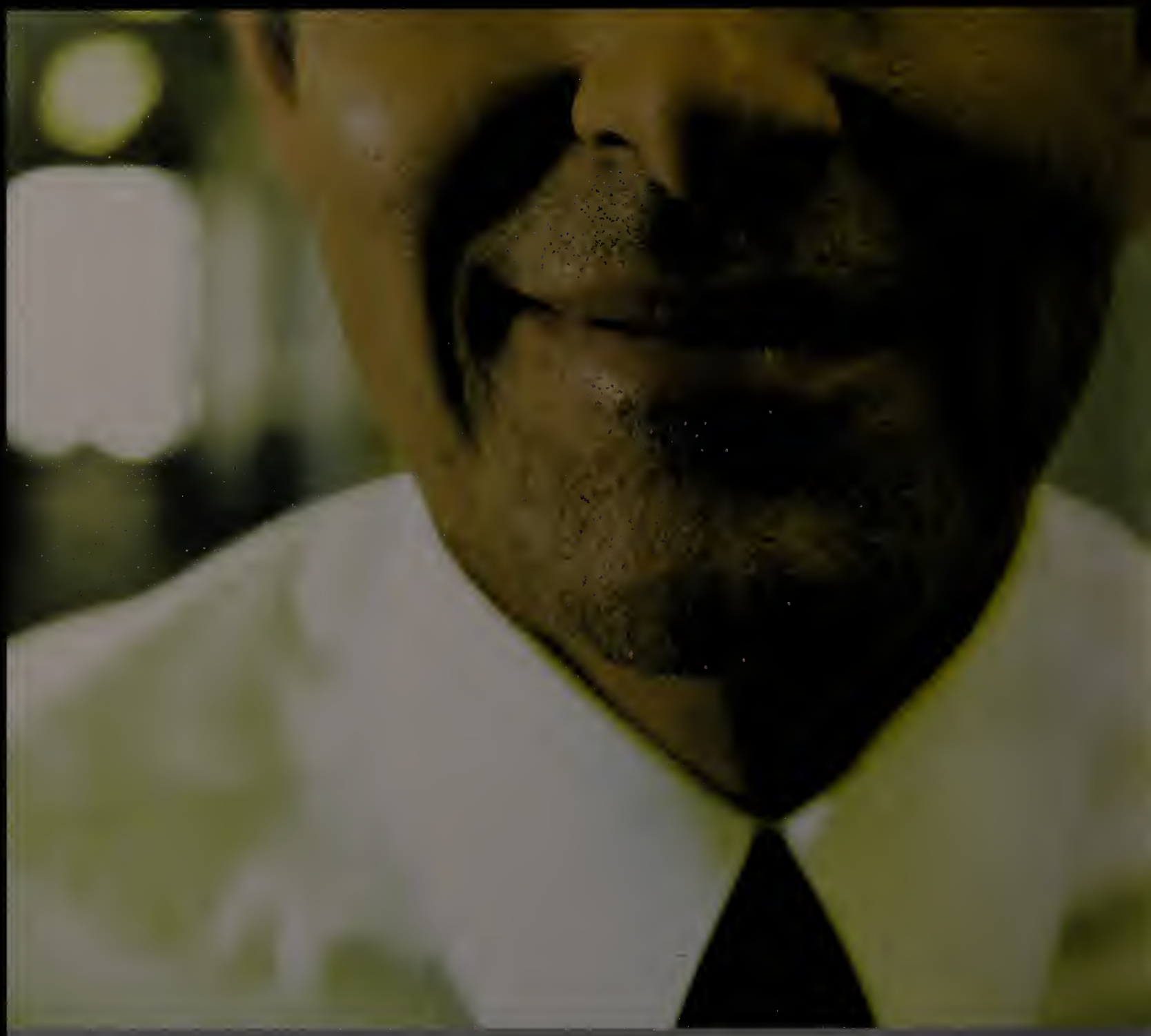
Q: What impact has SNIA had on the industry?
Childs: They're quickly moving forward in terms of putting these standards together. It's ironic because I didn't think customers really cared that much about the standards, but a couple of the big customers I've been talking to recently have also been watching the SNIA. They've said that as soon as some of these standards become reality, *then* they'll think about implementing SANs. Once they can see some kind of vendor adoption of these standards, some common interoperability, then they'll be much further along the path of adopting SANs in their own environment.

SNIA has also done a fantastic job in terms of getting things going quickly. The Fibre Channel committee and its work with the Fibre Alliance, for example. Also the third-party copy extensions that the backup group worked on. These things have happened in a much shorter time frame than I would have expected. There's a huge market for this technology, and vendors really want to get going. But this is going to contribute to overall customer acceptance very quickly.

Q: What advice would you offer a company planning its SAN strategy?
Childs: To not jump in right away with both feet. A company needs to very carefully evaluate the fate of the industry and where it wants to be with its storage environment and applications use of its storage environment over the next few years.

Q: How has BMC been keeping pace with user needs?
Childs: BMC has always touted itself as really strong in terms of application knowledge and awareness and database knowledge and awareness. And that, coupled with the management capabilities of some of the products that we have, puts us in a position where we feel we can help customers manage their storage-area networks as they come onboard.

We want to provide customers with the ability to manage their hardware component and the elements that comprise their SAN. And we want to manage the data itself. We select the right place for the data and pick the right mechanism for moving data from one location to another or to access that data within the context of a SAN. And with our application and management knowledge, we believe we'll be able to provide the customer with some good solutions. ◗



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management in their image. Today, we view leadership as a skill at all levels, not just at the top. Leadership in IT doesn't mean autocracy but inspiration and consensus-building. Will our notions of leadership stay that way? Not necessarily, if the 21st century takes us in a more authoritarian direction.

■ The biotechnology revolution will tempt managers to monitor and invade workers' privacy in brave new ways. Soon, implantable sensors, computers and perhaps even DNA treatments will let us communicate, manage and even clone a workforce in dystopian ways. Will managers open this potential Pandora's box?

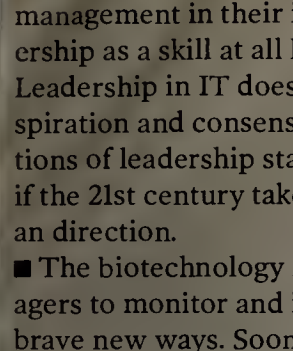
Thank you for reading, and I hope you'll keep reading in the 21st century. ◗

DAVID MOSCHELLA

Ten turning points in the IT industry's history

WITH ALL THE FOCUS on the Y2K countdown and the coming millennium, it's easy to forget that we're also approaching the end of a century, one where computers have gone from the virtually unimaginable to the virtually inescapable.

As a way of looking back, I have selected what I think are the 10 most decisive developments in the history of the U.S. IT industry. Rather than focus on the many dramatic breakthroughs in semiconductors, storage, software and networking, I have focused on the specific actions of individuals, companies and governments. Whereas the laws of physics make certain technological innovation almost inevitable, the list below shows that the actions of humans are nothing of the sort.



DAVID MOSCHELLA is an author, independent consultant and weekly columnist for *Computerworld*. Contact him at **dmoschella@earthlink.net.**

1909. Stanford University President David Starr Jordan provides $500 to help Lee deForest develop the vacuum tube. In the 1930s, the leadership of another Stanford professor, Frederick Terman, helps assure that what's now called Silicon Valley would lead the world in the integration of technical knowledge, entrepreneurship and venture funding.

1914. After a dispute with NCR CEO John Patterson, Thomas Watson Sr. leaves the cash register giant and joins the underachieving Computing, Tabulating and Recording Co., which Watson in 1924 renames International Business Machines. The ruthless techniques Watson learned at NCR become a key factor in IBM's success. Who knows what our industry would look like if Watson had simply stayed at NCR?

1956. In order to settle the government's second antitrust suit against IBM, the company agrees to exit from the processing services business and to sell, as opposed to just rent, its tabulating equipment. These semivoluntary decisions help launch the independent computer services, computer leasing and used equipment businesses.

1964. IBM successfully introduces its radically new 360 family of computers, assuring that its near monopoly in electromechanical accounting equipment makes a smooth transition into the computer age. The descendants of this 35-year-old system still dominate high-end corporate computing. Enough said.

1969. Shortly after the government launches its third antitrust suit, IBM announces that it will unbundle its pricing — charging separately for hardware, software and services. This decision initiates a huge and ongoing shift away from vertically integrated offerings toward a much more specialized IT industry.

1981. IBM introduces its PC. Open systems, end-user computing, microprocessor power, the Microsoft and Intel monopolies and the rise of Compaq, Seagate and more follow. This is truly the IT industry's Big Bang.

1984. The government-ordered breakup of AT&T revitalizes competition in both telecommunications services and equipment, setting the stage for today's network-centric era.

1986. The National Science Foundation establishes a network of five supercomputing centers, triggering an explosion in university Internet connections. There have been many key moments in the development of the Internet, but the shift from military applications toward general university usage was a critical early stage.

1990. IBM and Microsoft officially go their own operating system ways. Microsoft opts for Windows and NT; IBM gets stuck with OS/2.

1998. The U.S. government launches its antitrust suit against Microsoft. All history suggests that an even more competitive and dynamic industry will result.

Although not one of these far-reaching developments was inevitable, just imagine where we'd be if events had gone another way. What's on your list? ◗

READERS' LETTERS

Fifth amendment

REGARDING David Moschella's five rules on employee monitoring ["Be Reasonable About Monitoring Internet Usage," News Opinion, Nov. 1], the fifth needs to be reworked.

Employees who have visited sites that are subsequently blocked by the company should not be subject to discipline. To do so is deeply un-American. Also, one person's "hate group" is another's "freedom fighters."

A proper Rule 5 would read as follows: "The company reserves the right to block and/or monitor Internet access to any sites management deems offensive or undesirable. These sites include those focusing on sexually oriented material, those actively promoting violence and those publishing material that management deems of no relevance to the business."

Michael G. Jones
Coral Gables, Fla.

Wanted: IT incentives

COMPUTERWORLD's Nov. 1 Online Salary Satisfaction Survey ["The Pay Ain't Enough," Business] dismayed me. Is it any wonder there is an IT worker shortage? Who wants to go to school for four years only to get a low-paying job with skills that will be obsolete in three to five years? Where is the attraction in that?

James Bell
Charlotte, N.C.

Unfair generalizations

IN "The Monsters Among Us" [Business Opinion, Nov. 8], Peter G. W. Keen may have described his two subjects, Richard and Edith, to a tee, but I would be completely insulted if someone were to make such generalized comments about me after one day.

I agree that communication is critical to an IT manager's job. But isn't it critical to a marketing or accounting manager as well?

A lot of my colleagues are forced into a straightforward approach. This, while rude to some, is somewhat required to be a successful manager of IT. The demands on our time can be overwhelming. We are expected to be project managers, people managers and help desk support, all at the same time. We then have vice presidents wondering why we are over budget and the projects aren't done on time.

Mr. Keen, how would you feel if someone spent a day with you and then negatively generalized about the entire education or consulting profession?

Paul Marcoe
Assistant vice president, IS
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Federal Way, Wash.
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Industry needs to act

KUDOS to Bill Laberis for his surprisingly conservative editorial about avoiding the tangle of federal Internet regulation ["Internet Better Clean Up Its Act — Before Feds Step In," News Opinion, Nov. 8].

His opinion seems uniquely well-balanced, recognizing both the need for caution and care in growing the Internet and the need to deal with the standards of moralistic and economic behavior online before the feds do.

The federal government only partially enforces such things as cigarette and alcohol buying ages and handgun buying, and the Internet is even less-friendly territory for federal proclamation, probably because America doesn't much control it anymore.

Ted Wallingford
Manager of IT
Independence Excavating Inc.
Cleveland

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DAN GILLMOR

Internet tax moratorium is basically unfair

WHAT WOULD YOU CALL a tax policy that a) favors businesses catering to people with higher incomes and education, b) undermines Main Street businesses across the nation, and c) will erode the tax revenue that pays for state and local services?

In a rational society, you'd call it nuts. Yet in today's America, it's the law.

I'm referring, of course, to the current tax policy governing online retailers, which itself is an extension of the tax loophole benefiting catalog retailers and their customers. Cyberstores, which typically charge no sales taxes to customers outside their home states, have an enormous advantage over local retailers, who must charge these levies.

DAN GILLMOR is technology columnist at the *San Jose Mercury News*. Contact him at **dgillmor@sjmercury.com.**

The policy is ripe with irony. It favors an industry run by people who scream bloody murder when anyone suggests any government involvement in their affairs. It favors customers who have credit cards and can afford computers and Internet service subscriptions. It rewards businesses that undermine downtowns, our traditional notions of physical community.

Congress has never had the guts to close the catalog sales loophole for fear of seeming to favor higher taxes. But the lawmakers are going to have to face up to reality sooner rather than later because Internet commerce will only accelerate in coming years.

Internet commerce will accelerate because there would be some genuine advantages even in a tax-neutral world. Eventually, the undermining of the tax base will force Congress to face up to this issue. Meanwhile, an Internet-tax commission is stacked in favor of Net interests.

The arguments in favor of restricting taxation on the Net tend to center on the medium's promise — the notion that we shouldn't do anything to slow down its rise. No one fundamentally disagrees with this.

No one, least of all me, is suggesting that the Net isn't a revolution for the better in many ways. Technology is adding efficiency to all manner of business processes. It's creating a vast new communications marketplace.

There are some legitimate difficulties with Internet sales taxes. One is the jurisdiction question, given the essentially locationless nature of the Net. Another is whether Congress has sufficient authority in this area, given the interstate-commerce clause of the Constitution.

The most persuasive argument of all, in my view, is the nature of sales taxes themselves. Sales taxes are regressive. They should be abolished in favor of a less regressive system of levies. If we're lucky, this debate will lead to a true re-examination of taxation in general.

But the effect of the current system is clear: It discriminates against retailers who don't sell on the Net or by mail. It encourages the destruction of local tax bases. It's wrong.

Many states assess "use" taxes, equal to sales taxes, on goods purchased out of state. These laws are rarely enforced. But they will be — and with terrible intrusiveness — if state and local tax bases erode sufficiently. Is that what the antitax crowd wants?

The debate we should be having is not whether to extend the Internet tax moratorium forever. It's about how to bring a fair tax structure to the Net. If the Internet community thinks it'll get away with its special favors forever, it's living in a fantasy world. ◗

CHRISTOPHER COX

Internet tax ban means more sales tax revenue

THE INTERNET TAX FREEDOM Act, a three-year moratorium on new and discriminatory Internet taxes that I co-authored with Sen. Ron Wyden (D-Ore.), is now 1 year old.

This milestone provides a useful opportunity to check on how the law has performed. Has it helped the Internet grow into a more useful tool for consumers? Has it, as some claimed it might, caused a falloff in tax revenue for states or cities?

U.S. REP. CHRISTOPHER COX (R-Calif.) is chairman of the House Policy Committee. Contact him at **christopher.cox@mail.house.gov.** More information about the Internet Tax Freedom Act is available at *www.house.gov/chriscox/.*

You already know the answer to the first question. The growing Internet is bringing the benefits of knowledge, trade and communications to more people in more ways than ever before.

As for taxes collected by the government, they're up — way up. In the first quarter of this year, sales tax collections in California alone were up 8.8% from last year. In the second quarter of 1999, they were up 9.5%. The trend is the same nationwide, with sales tax revenue up 5.6%, according to the latest Census Bureau report.

This increase in sales taxes, coinciding with the explosion of commerce and information on the Internet, comes as no surprise. The fact that the success of our overall economy is linked directly to the fate of the information and technology sectors was clear, even in advance, to elected officials across the nation.

Even tax collectors agreed. In my home state of California, for example, the State Board of Equalization, which collects sales taxes, and the Franchise Tax Board, which collects income taxes, formally endorsed a permanent ban on new Internet taxes. In Ohio, state Treasurer Ken Blackwell warned that misguided efforts to impose Net taxes threatened to create a "state-based cybureaucracy."

California Gov. Pete Wilson and his successor, Gov. Gray Davis, both endorsed the Cox-Wyden law, as did Gov. William Weld and his successor, Gov. Paul Cellucci, of Massachusetts and Govs. George W. Bush of Texas, George Pataki of New York and James Gilmore of Virginia. One county tax collector summed it up when he told Congress to pass the Internet Tax Freedom Act because "our county's future tax base will depend increasingly on job creation and productivity gains from technology."

Not everyone, of course, sees the future of the new economy so clearly; some even feel threatened by it. A handful of opponents to the Internet Tax Freedom Act have consistently argued that unless new Internet taxes are authorized, sales tax revenue to our cities and states would dry up, as the Internet kills off retail as we know it.

Experience with another invention that was once the latest in high technology — the telephone — suggests that won't happen. As we close the 20th century, storefront retail sales continue to prosper side by side with "remote" catalog sales made over the phone. Today, despite the ease of calling 1-800-you-name-it, catalog sales amount to less than 3% of total retail sales. Internet sales are even less than that: just 0.3% of total retail sales in the most recent year. Meanwhile, technology-spurred economic growth has led to simultaneous increases in taxable sales of nearly 10% per year.

The U.S. Supreme Court, in deciding the cases that have given us our current tax distinction between remote and in-state sales, said taxes can be collected only from people and firms with a substantial "physical presence" in the jurisdiction. That is just a fancy way of saying, "no taxation without representation." It is sound public policy, as well as good economics.

The art of successful taxation has been compared to plucking a goose: The object is to get the greatest amount of feathers with the least amount of squawking. Recognizing that, policy-makers would be wise to tread lightly when it comes to new Internet taxes, if the object is to protect and expand the tax base. Our Internet Tax Freedom Act has been an important means of ensuring that result. ◗

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BUSINESS

TRUCK TRACKING

Using a wireless, Internet-based tracking service from @Road, local fleets like JB Trucking keep tabs on trucks at a fraction of the cost of systems used by long-distance trucking companies. On top of improved customer service, the technology is saving truckers thousands in reduced cellular phone costs. ▸ 38

SANTA.COM

Yes, there are Christmas trees and Santa hats, even red and green chairs, throughout the office of Santa.com. But there are also long hours and intense technical challenges — what you would expect at your typical start-up. Yet, fueled by dreams of IPOs dancing in their heads, IT staffers at Santa.com maintain their holiday cheer. ▸ 42

START-UP MANIA

More start-ups fail than succeed, so before you join one, you need to ask yourself if you have what it takes. The hours will be long, and unless you thrive in an environment full of change, the stress may be overwhelming. And because IPO success isn't guaranteed, all the hard work may be for naught. ▸ 44

INTEL'S VIEW

Intel CEO Craig Barrett shares how he transformed Intel into a major e-commerce player, even though he's a former Stanford University science professor with no formal business training. Intel now generates sales of $1 billion per month. ▸ 49

ACRONYM SOUP

Jargon Judge disagrees with the use of acronyms such as ISP or ASP for relatively straightforward business services. These abbreviations are overused, she says, and should be reserved for more complex technologies. And with the rapid change in these services, many of these acronyms have become meaningless. ▸ 50

SAVING MONEY

Wells Fargo saved $200 million on IT purchases over the past four years. How? By arming itself with reams of information, such as the vendor's current financial standing and data about its own companywide technical needs when it comes time to negotiate an IT purchase with a vendor. ▸ 52

MIDDLE MUDDLE

Cutting out the middleman, or disintermediation, can result in greater profits and increased access to customer information. However, this can lead to new problems — the need to revise systems to fill single orders and angry channel partners. The downfalls make reintermediation, using the Internet to reassemble supply-chain partners in new ways, an attractive proposition. See QuickStudy. ▸ 54

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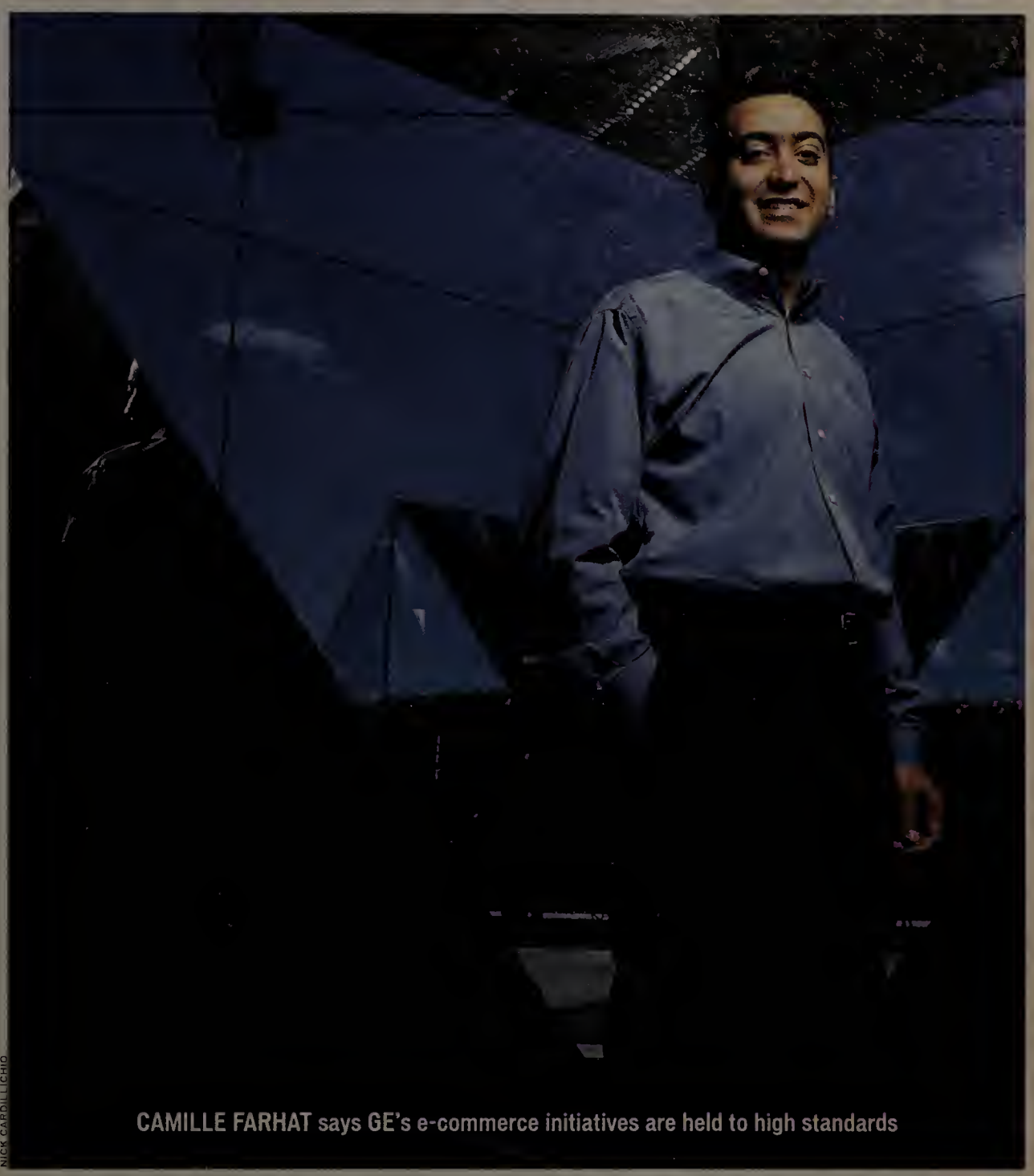

NICK CARDILLICHIO

CAMILLE FARHAT says GE's e-commerce initiatives are held to high standards

E-QUALITY IN ONLINE SERVICE

Two recent studies found high percentages of customers dissatisfied with online service because of problems such as inaccurate product information and a lack of notification when a product is out of stock. The likely culprits? Poor back-end integration and a focus on speed over quality. Companies like General Electric share how they enforce quality standards to make sure they don't drive customers away in frustration.

46

Short-Haulers Tap Net for Tracking

Lower-cost Web-based system could be boon to short-distance truckers/cabs

BY MATT HAMBLEN

JB TRUCKING in Tumwater, Wash., updates customers on where its trucks are so the customer's unloading crews won't waste time waiting for a vehicle caught in traffic.

The service is possible through a FleetASAP system from @Road Inc. in Fremont, Calif. It's described by analysts as a low-cost method of providing wireless, Internet-based tracking and communications for truck and taxicab fleets.

"We've had more and more customers calling to ask where a truck is so the forklift operator can do something else until the truck comes," said Jim Geer, general manager at JB Trucking. Sometimes the deliveries must be "just in time" because the customer plans to quickly redistribute the load to other trucks.

Geer said the customer service aspect of the system is valuable enough, but his company has already seen a 20% reduction — about $500 per month — in cellular phone costs. He predicts savings of as much as $40,000 annually — about 3%, including cell phone, fuel and driver time savings — because route problems are avoided or easily corrected.

The system has been installed in all 30 of the company's trucks since Sept. 1. In the truck cab, there are two small boxes. One is an @Road Internet Location Modem that uses a Global Positioning System (GPS) and a wireless connection to the Internet via a Cellular Digital Packet Data (CDPD) network from AT&T Corp., operating at 19.2K bit/sec. Geer can use a PC in his office to log on to a password-protected @Road Web site and see the trucks on a regional map.

The other box is an Internet Data Terminal, allowing two-way messaging using CDPD. It has a 24-button keyboard and a text area for short messages of up to 160 characters. When a driver picks up a load, he can punch in a bill of lading, the number of pieces and weight, also recorded at headquarters.

"Customers want that information all the time, and some have even called a year later saying they never got the delivery," Geer said. "That's what you call cover-your-ass info."

At Budget Chauffeur Drive in Carson City, Nev., @Road is used to track 11 airport shuttle vans and cabs. The company expects to save 95% on its two-way radio and cellular phone costs, which are about $2,500 per month, said Dennis Christensen, general manager.

Both boxes cost about $400 per vehicle, and the service is about $40 per month, according to customers. Christensen said he hopes the system will help audit drivers who don't report a fare and pocket the full amount. "A taxi driver can raid your chicken house blind," he said.

Budget Chauffeur also will use the system to get cabs to customers quicker because they can track the nearest one.

Christensen said he sees a big benefit over cell phone service because the GPS system operates from satellites. Cellular service has many dead zones in the Carson City area.

Analysts said @Road is a cheap alternative to competitors that cater to long-haul, nationwide truckers. Qualcomm Inc. in San Diego operates OmniTRACS, a nationwide satellite network to track and communicate with trucks. HighwayMaster Communications Inc. in Richardson, Texas, offers GPS tracking and cellular voice and data service. @Road's costs would be 10% to 25% the cost of the long-distance systems, said Stephan Beckert, an analyst at Strategis Group in Washington. He said 80% of trucks in the U.S. operate locally, providing a big market for @Road. ◗

JIM GREER, general manager at JB Trucking, says @Road's system can help with "just-in-time" deliveries and multitasking drivers

REX RYSTEDT

MOREONLINE

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ERP Project Problems Plague City Payroll

BY CRAIG STEDMAN

The city government in Oakland, Calif., is learning some of the hard lessons enterprise resource planning (ERP) projects can teach end users — and many of them have more to do with planning and training than with technology.

Oakland's $21 million installation of Oracle Corp.'s ERP applications has frustrated users in the finance department and resulted in missing or incorrect paychecks for many employees after payroll clerks ran out of time to enter needed data into the system.

There have also been technical difficulties. For example, a consulting firm didn't meet its schedule for converting data from the city's old IBM AS/400 finance system to the Unix-based ERP setup, resulting in cost overruns and a rollout delay of up to seven months. And the payroll department is still having trouble getting Oracle's software to run reports, said assistant city manager Dolores Blanchard.

But the user training issues affected the city in a big way. Workers "have complained that they don't feel prepared to use the system," said Jayne Becker, policy assistant to City Council member Dick Spees.

The training "could have been handled better," acknowledged Blanchard, who is overseeing the ERP project. "There was a lot of frustration [among users] when the system first came up."

That's a common lament after ERP installations in both private and public sectors, said Jim Shepherd, an analyst at AMR Research Inc. in Boston.

"Training is almost always inadequate," Shepherd said. That can have "a huge downside" if end users — who usually are asked to change the way they work — start thinking the software doesn't work, he said.

In Oakland's case, an internal survey of end users in October found that fewer than half considered themselves skilled in using key Oracle financial applications. Some of the 350 users were trained on the basics of the applications but were shut out of classes on specific tasks, such as processing purchase orders, after more workers tried to sign up than expected, Blanchard said.

And some finance applications still had bugs when they went live in July, so software didn't work the way the users had been told it would, she said.

The city has added refresher courses for struggling users and redesigned some classes to include real-world examples, such as how to process bill payments. A follow-up survey last month showed that about two-thirds of the finance users now view themselves as skilled with the software.

But then 1,100 of the city's 5,000 paychecks didn't get printed or were incorrect on the first Oracle-based payroll run in November.

A Rough Start

Oakland's city government has had these problems on its Oracle applications project:

- Costs went $2.5 million over budget, an overrun of 14%.
- The launch of new finance and payroll systems was delayed by four and seven months, respectively.
- Almost 25% of the city's workers got incorrect checks or weren't paid in the first payroll run.
- Demand for finance applications training was greater than expected, initially shutting out some users.
- Some training classes had to be redesigned and repeated after going live.

Some mistakes were due to incorrect settings of pay rates in the software, Blanchard said. But 630 checks were missing because payroll clerks didn't manage to enter time-card data into the new software on time. The clerks were trained but were then left on their own to enter the data, Blanchard said.

For the second payroll run, they were brought to a central office "to help them get through" the data-entry process, she said. That brought mistakes down to about 3% — the level the old AS/400 system typically produced. ◗

MOREONLINE

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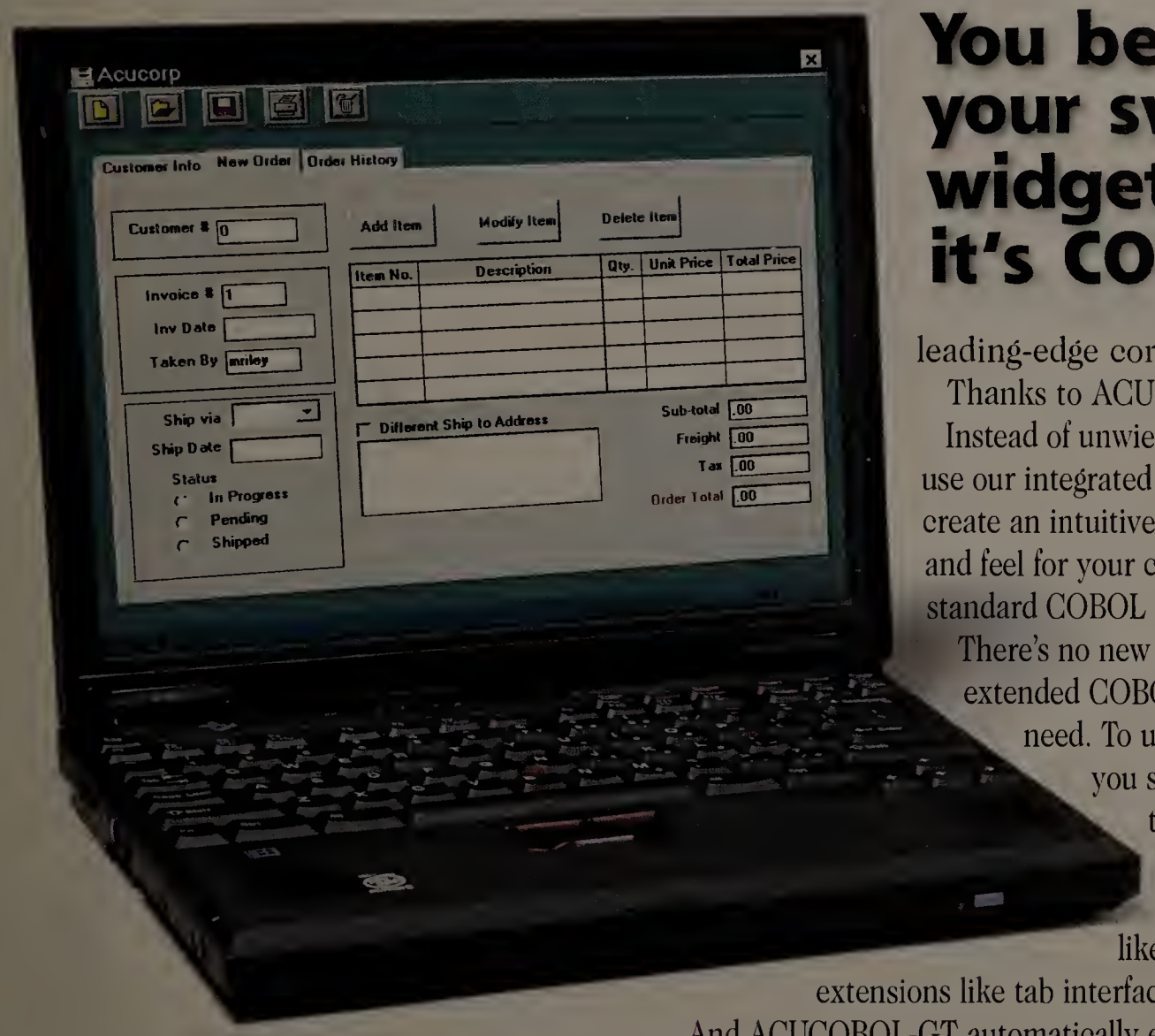
This is COBOL?



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Ulster Bank Uses PKI Product to Protect Transactions

New service puts banking customers online securely

BY ANN HARRISON

When planning its new online banking service, Ulster Bank Ltd. in Belfast, Northern Ireland, began looking around for a secure system to authenticate transactions.

Local competitors offered online banking to only select customers or business clients. Ulster Bank wanted to enhance its services by offering secure electronic transactions to general customers at its 200 branches.

The bank decided to adopt the public-key infrastructure (PKI), which is becoming a security standard for online banking applications.

The bank looked for a PKI product that it could use with a variety of applications, said systems manager Robert Magee. It selected the UniCERT Advanced Registration Module (ARM) from Baltimore Technologies PLC in Basingstoke, England.

Baltimore "understands the restrictions and laws in many countries and has already solved many of the problems that companies doing business in North America are just beginning to address," said Kristen Noakes-Fry, an analyst at Gartner Group Inc. in Stamford, Conn.

Although the bank looked at other PKI products, Magee said, it was drawn by the flexibility of the Baltimore products and their ease of use. And Baltimore is known for its understanding of European encryption regulations.

Identity Confirmation

ARM automates the certificate registration process, allowing banks and other businesses that choose to become certificate authorities to register large groups of users for digital certificates, which are used to authenticate customers in transactions using public and private encryption keys. When a customer wishes to log on for a secure transaction, his private key is used to encrypt the data, which is decrypted with his public key when the bank receives the information.

The registration process begins when a customer submits an application and calls the bank for authentication of his identity. He is then transferred to an interactive voice mail system, which generates an identification number to be used for transactions.

Magee said the ARM module is now used to support Ulster Bank's 500 customers with an additional 20 users per day joining the system. The certificates are used to digitally sign and secure customer information and identify customers when they log on. "I expected more problems with bugs and misunderstandings about what requirements were, but it really has been a fairly smooth process," Magee said.

The business goal of the project, according to Magee, was to offer customers a convenient and easy-to-use secure online banking system that would complement the branch network. The service has been available since October, but Magee said customer response has exceeded the bank's expectations. He said it's still too early to tell if the system is saving the bank money.

Ulster Bank is investigating using digital signatures to provide secure e-mail between the bank and its customers, said Magee. He added that the bank is also considering offering the service to noncustomers or forming reciprocal arrangements with other "closed user groups," such as partner banks.

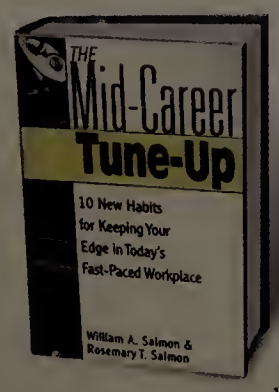
The company is also looking to enhance its Internet banking services, such as the ability to securely upload files for payment instructions to the bank. ◗

For the Bookshelf

Guides for the midcareer professional, rookie manager and future consultant

BY ALAN EARLS

The Mid-Career Tune-Up: 10 New Habits for Keeping Your Edge in Today's Fast-Paced Workplace
By William A. Salmon and Rosemary T. Salmon; American Management Association, New York, 1999; 200 pages, $17.95, paperback

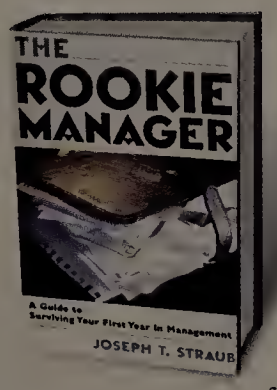


To prosper in today's constantly changing workplace, it's vital to stay current, adjust quickly to new roles and continually update skills. This can be tough, especially for people who are well along in their careers, with heavy professional and personal responsibilities. Because information technology is ever more results-oriented, this book will feel very relevant — even though it's written for a broad business audience. And it should provide a good source of focus and direction for anyone who has woken up to find that their computer career hasn't taken them where they thought they wanted to go.

The Mid-Career Tune-Up takes a "tough-love" approach to helping professionals acquire new work habits to help them take control of their jobs, apply existing skills to new challenges, flourish and maybe even feel more successful in their careers.

Specifically, the book emphasizes the need to take an honest look at yourself and figure out if you're delivering what you're being paid to deliver. In addition to lots of hard-nosed self-assessment, the book focuses on steps that can help you better balance time, strengthen communication skills, boost workplace credibility and resolve conflicts. The book also contains several worksheets that enable you to chart your progress. And its moderate length gives it a lot of punch per page.

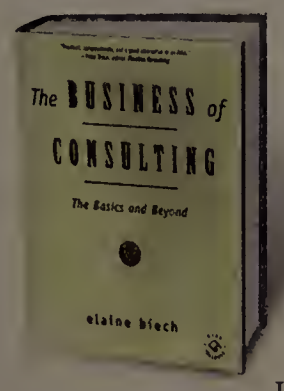
The Rookie Manager: A Guide to Surviving Your First Year in Management
By Joseph T. Straub; American Management Association, New York, 1999; 176 pages, $15, paperback



OK, so you were a great code jockey. So great that you got to lead a team. And now it's official — you've been promoted into management! If you're like most new managers, after the initial excitement wore off, you discovered a whole new level of stress and anxiety — with no place to go for advice. Straub, a onetime manager in the aerospace field, tries to fill that void with a well-organized, albeit rather dry, walk-through of managemental do's and don'ts. While none of this is IT-specific, his sections on team building and delegation may be particularly applicable to the IT professional making his first foray into management.

The Rookie Manager has the virtue of being concise and fairly brief. And it does cover most of the bases. But reading it requires dedication — like that needed for sitting through a long lecture without fidgeting. It's hard to argue with any of the advice Straub dishes out, but because it's often preachy and inelegant in its presentation, it lacks a lot of potential impact. However, if you are a rookie manager, this book is worth acquiring — just be sure you are in a focused and energetic frame of mind before you try to read it.

The Business of Consulting: The Basics and Beyond
By Elaine Biech; Jossey-Bass Pfeiffer, San Francisco, 1999; 246 pages, $39.95, hardcover



Fed up with being underappreciated? Expecting to be downsized out of your IT job? Or maybe the lure of the money to be made in IT consulting has already given you the entrepreneurial bug? Regardless of whether you're already consulting or considering this career path, let nothing keep you from Elaine Biech's superb book, *The Business of Consulting.*

This book conveys passion and authority on nearly everything having to do with consulting. It's well-organized, thorough and actionable. In fact, when combined with the dozens of checklists and forms provided in Word format on a companion floppy disk, the book provides templates for just about everything needed to get started and stay successful in consulting. (It's surprising that more publishers haven't adopted this helpful feature.)

Biech focuses on consulting in general, not IT consulting. And she emphasizes the viewpoint of the sole practitioner. Nonetheless, her advice and presentation skills make her well worth reading. Indeed, her chapter on building long-term client relations alone — although at odds with the Wild West reputation of some consultants — justifies acquiring a copy of the book.

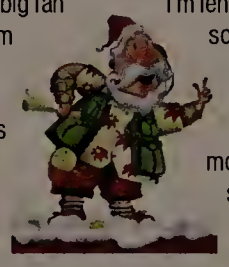
In addition to covering just about all of the bases, Biech's book has a secret ingredient: energy. It makes you want to drop what you're doing and start soliciting clients. ◗

Earls is a freelance writer in Norfolk, Mass.

WORKSTYLES

What It's Like to Work at . . . Santa.com

Interviewee: Brent Ayers, director of technology
Company: Santa.com Web site, owned and operated by Holiday Channel Inc. Founded in 1997.
Main location: San Jose
Tenure with the company: "I joined full time in May, but I did the site last year as a consultant. I had a consulting firm for five years, and two of my people came here with me."
What made you give up the consulting life to join full time? "Stock options. [Laughs.] Also, I'm a big fan of Christmas. My mom loves Christmas, and we always had three trees and decorations all over the house starting right after Thanksgiving. So it's fun to me to be involved with Christmas all year-round. And to join a company that had no [information technology] and to design everything and the applications was just an incredible challenge."



Number of IT employees: Five software engineers, one systems administrator and an on-call staff of consultants from Acclaim, a Sun reseller and professional services organization.
Number of employees (end users): 30 to 35
What kind of traffic is the site getting? "100,000 hits per day, and [it's] going up every day. We've seen a significant increase since Thanksgiving."
Most popular features: Holiday cards, the holiday planning checklist and a feature to create a wish list and e-mail it to friends and family. The site is up year-round, with changing content.
Technical infrastructure: "The site runs on Sun [Microsystems Inc.'s] Solaris and Apache Web servers. The majority of pages are static HTML that are generated from a variety of tools. The dynamic pages are generated by PerlScript running under FastCGI."
How do you manage with only six people? [Laughs.] "We all work 24 hours a day. Mainly, we try to focus our energy on what's important. In my consulting practice, we had developed libraries of reusable code from other projects, and we reused some of those for Santa.com."
Workday: "A typical day for a junior engineer would be eight to 10 hours. But of course now we're in a crunch period. My philosophy is that, while we are a start-up and working very hard to be successful, I wouldn't ask employees to give up their lives. I get in at about 9:30 a.m., leave at 5:30 p.m. to be with my kids, and then I'll work again from about 8 p.m. to 3 or 4 a.m. I'm lending a hand to write some code because we're so crunched now. I'll take a break. March will be a slow month, and I can recoup some of the time.
Kind of offices: "We have a mix of open space and individual offices."
What do you see on people's desks? "Small Christmas trees, Jingle bells, Santa hats. We all have Santa squeeze balls that we throw at each other."
Must people carry beepers and cell phones? "Yes. We rotate night duty."
In-house cafeteria: "No, but we have a kitchen that's stocked with snacks and goodies to graze on."
Where the office gossips: "Johnny Rocket's, a '50s-style hamburger joint right downstairs."
Office mascot: "We have all been assigned elf names. I'm Head Technog – like eggnog."
Little perks: "The best one is box seats to the San Jose Sharks hockey games – [you] have to be extra good and on Santa's list to get that."
The one thing everyone complains about: "We don't complain often. But probably it would be how fast things are moving, and we never have time to catch up. We'd like to have some point where we can say, 'OK, we're done for now.' And that just isn't occurring."
Quote: "This is a fun environment, a mentally challenging environment, which for me makes it worthwhile. And we're all hoping for an [initial public offering] or some way to turn in our stock." – *Leslie Goff*

PETER G. W. KEEN

Innovate or flop

WHILE MANY COMPANIES are still gearing up for e-commerce, e-business, e-services and e-retailing, leading businesses are increasingly talking about the disappearance of the "e." Just as ATMs and cash management were once "electronic banking" but are now just part of banking, we are very close to e-commerce becoming just commerce. It may take four years before this trend becomes fully established, but it's hard to see how it could take longer.

Look back to 1995 and consider the degree to which the Internet has permeated every area of business. Then, think ahead four more years. Surely there will be at least as much innovation by 2004 as there has been since 1995.

There's the catch for IT: It's chartered to innovate, but execution — implementing, operating, maintaining and upgrading systems — will continue to be a huge burden. This time around, IT must combine innovation and execution, rather than focus on its historical priority of execution. This is not an "either/or" but a "both/and." Innovation without execution is fantasy. Execution without innovation is bureaucracy — and a short path to outsourcing the lot.

IT is now where those of us who've been in the field for a few aeons (I started as a programmer in 1964) have believed it should be: a central force for innovation in business, society, education and individual well-being. We're living in a time when no one can get enough innovation through technology; that's the real implication of the explosion of dot-coms, initial public offerings and telecommunications mergers and acquisitions. Innovate or die.

> *Execution without innovation is bureaucracy — and a short path to outsourcing.*

IT now has a license to be creative. That's very new, and perhaps many IT organizations have been a little too wary in taking advantage of the opportunity. We've been beaten up by ERP implementations, Y2K, the complexity of middleware and the curse of legacy systems. We're exhausted by the absurd work overload so many IT professionals are facing. But IT is now at the center of business innovation.

Innovate or die, yes. But we still live with execute or flop. We're seeing a rerun of the PC era, which began with innovation everywhere and moved to the urgent need to avoid multitechnology chaos, to integrate networks and to provide support and standards. The key terms were *integration, architecture* and *client/server*.

It may be déjà vu for IT, unless it organizes in time. The consequences of e-commerce innovation include growing business dependence on IT. Scalability — the ability to handle uncertain increases in volume and rapidly increase capacity — replaces integration as the IT watchword. *Reliability* means staying in business, and *security* means customer trust. Reasonably enough, the people who are innovators aren't likely to have the knowledge — or the patience — to address these issues. The very skills and mind-set of IT professionals who are best in the details of operations may get in the way of the "wing it," "let a thousand flowers bloom" and "fire, ready, aim" approach of innovators.

For all the criticisms made about IT — too technical, weak in communication, lacking business knowledge, etc. — IT is very responsible. That means it must continue to be the steward of reliability and scalability, among other things. IT needs to get across to the business just how important this role is *in business terms*. Too often, it talks in IT terms and comes across as insensitive to the innovation side of e-commerce. Then, IT must make sure it's still integral to business innovation.

How can IT achieve this? It's called marketing. Marketing isn't about hyping products but about communicating a clear message and what IT has to offer to customers, mobilizing your own people by giving them a story to hear and tell and creating a clear sense of what the company — or, in this case, the IT organization — is about.

Look at how clearly companies like Schwab, Dell and Cisco communicate that they're not just in the dot-com game. Customers understand their service and channel strategies, their differentiation from the pack and their organizational focus. ◗

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STARRY-EYED START-

Before you sign on with a start-up company, ask two critical questions: Do you have what it takes? And do you really know what you're doing?

BY MARY BRANDEL

It was about a week before Andy Rappaport was expected to begin work as lead software engineer at Eprise Corp., a start-up Web design firm in Framingham, Mass.

He went into the office to sign the required new-hire paperwork when he was called in to a meeting. Turns out, the company wanted *him* to interview the next round of new hires.

"The candidate asked me, 'How long have you worked here?' I told him, 'I start next week,' " Rappaport recalls.

Such is life at a start-up company. The rules are written as you go. Job descriptions are in flux. And the pace ranges from very fast to even faster. As Rappaport puts it, "You're a resource before you're even on the payroll."

The number of people joining start-ups is on the rise, especially with venture capital funds being poured into new Web-oriented firms. Some people think they stand to strike it rich if they go to work for a start-up and it has a successful initial public offering (IPO) or gets purchased in a lucrative deal. But they may toil 60 hours per week for years just to watch the company sink. Guess which category is the larger?

If your stomach is sinking just reading this, you may not be cut out for a start-up. The people who are happiest at these high-flying companies are the ones who salivate — not sweat — at the thought of living and breathing work, changing priorities and even job descriptions on a dime and meeting challenges under impossible deadlines.

"We look at our watches, not the calendar, because things change so quickly," says Jim Jonasen, CEO of PeopleMover Inc., a prepublic software maker in Manhattan Beach, Calif. He likes to talk about the chief financial officer at PeopleMover, who used to be head of corporate finance at Disney. "His wife will call and ask, 'When are you coming home?' He answers, 'When we go public, honey,' " Jonasen says.

It's a good story, but the fact is not

JOHN SOARES

ANDY RAPPAPORT started interviewing other job applicants even before he officially started working as lead software engineer at Eprise

FOR -UPS?

every marriage, and not every employee, could survive the hours, the pressure and the sheer energy of start-up life. Can you, for example, handle the increased degree of accountability? After all, these companies usually have small staffs, with each person handling a lot of responsibility.

Some people call this trait "intestinal fortitude," and it's a characteristic Jonasen says he seeks in his new hires. "We look for people who have the courage to stand up and say, 'We should use that new flavor of XML, and here's why,' " he says. "As a start-up, that's how you take one of these quantum leaps and beat out the competitors."

You also need to be able to deal with long hours. From anybody's account, 50-hour-and-up weeks are the norm, "and 'up' is the operative word there," says James Challenger, CEO of Challenger, Gray & Christmas, an outplacement firm in Chicago. "And they can be unusual hours, in the middle of the night and weekends if crises hit."

A typical day for Mike Myer, director of product development at RightNow Technologies Inc., a Web-based customer service start-up in Bozeman, Mont., goes like this: "I typically wake up, work an hour or two at home and then go into the office and work into the night," he says. And while any information technology worker is accustomed to working in what Myer calls "maniac mode" for weeklong and monthlong stretches, "here, you've got much longer periods in maniac mode."

Unlike higher-level employees, programmers and other technical workers can expect start-ups to pay well for all the time they put in. "People who bring the actual skills in will get paid market wage or better because companies are competing against each other looking for those skill sets," Challenger says. First-rate (emphasis here on "first-rate") software engineers are making from $90,000 to $125,000 at start-ups, says Dudley Brown, a managing partner at BridgeGate LLC, a management search firm in Southern California.

On the other hand, vice presidents and directors can expect pay cuts, balanced out with stock options. But while nearly everyone employed at a start-up is offered stock options, no one should take these too seriously.

"People tend to think their company will have an IPO and everyone will get rich," says David Laskey, a senior programmer at Gomez.com, a Web start-up in Lincoln, Mass. "But for every eBay or Amazon out there, there's a lot more that go to the wayside. Options aren't everything they're cracked up to be — they're like buying a lottery ticket, except you get to influence it."

Laskey's advice is to keep your mind on your work, not the potentially big payoff. "The people who really will enjoy what they do will look at [stock payoffs] as a bonus," he says. "They'll keep their mind on the goal of, 'If we build a good company and we were able to contribute to its growth, there might be a nice reward at the end.' "

Start-up benefits may not equal those of larger companies. At RightNow Technologies, Myer says the benefits aren't as lucrative as those at his previous employer, AT&T/Lucent. But it's a different story at PeopleMover. "For us to get the kind of talent we wanted to get, our benefits look like Xerox's," Jonasen says. The company offers everything from gym memberships to dental insurance to on-site flu shots.

You need to be flexible about job descriptions at start-ups. "I came here to develop products, but there have been evenings where I set up routers to administer the firewall," Myer says.

There's always more work than bodies to do it. "You see individual programmers suddenly being thrust into an important customer spotlight and having to act like a polished sales engineer," Rappaport says. "And [you also see] the inverse, where the vice president of engineering is suddenly doing manual testing because that's what has to get done."

Less Pigeonholing

Flexible job descriptions can work to your benefit. "There's a lot less pigeonholing in most start-up environments," Laskey says.

At Gomez.com, where Laskey creates dynamic applications and content for the Web site, "we switch responsibilities around a lot" based on necessity and individual interest. For example, when Gomez started serving ads on its site, Laskey was charged with integrating the ad-serving software with the site. As a result, he began working with the salespeople to help them organize their advertising campaigns.

Such flexibility makes it easier to plot a career path. "I'm an engineer, but I spent some time in sales, and it's easy for me to move from my engineering job to a guy who goes to a lot of trade shows," Rappaport says. "I've also spent time as a manager to try that out, and I was able to come back to programming. I've been able to try out a bunch of things and dabble in things without changing my job."

You also have to be open to change in your day-to-day work. Because start-up strategies can change overnight, priorities are in a constant state of flux.

"The switch from working in a highly structured environment with a clear systems development methodology with a longer-term work schedule and budgets vs. 'get it done, get it out, get going' — for some IT people, that raises concerns about quality," says Jim Ware, vice president at Concours Group in Kingwood, Texas. "Deadlines are more important than quality." For people who believe in quality checks, reviews and extensive testing, this kind of shift would be traumatic, Ware says.

Brandel is a freelance writer and editor in Norfolk, Mass. She can be reached at marybrandel@norfolk-county.com.

DO YOU KNOW WHAT YOU'RE DOING?

Because start-ups can be risky business, it's important to really consider what you're getting yourself into before signing on the dotted line. Give some thought to the following:

The Managers – Look at the management team, says Dudley Brown, a managing partner at BridgeGate.

Brown advises trying to find the answers to such questions as, "What kind of success have they had in this industry? What is their reputation among venture capitalists, accountants, attorneys, recruiters, bankers?"

The Top Brass – Also ask to speak with the top brass. "Ask them questions like, What do they think the company needs to do to be successful? What are the goals of the company? What is their product exactly?" says Eprise's Andy Rappaport.

The Investors – Consider the investors and other service providers, as well.

The Competitors – And lastly, Brown says, look at the competitive environment.

Bottom line: "You've got to come away with a real sense that it's solid," says Gray & Christmas' James Challenger.

– *Mary Brandel*

THE QUEST FOR E-QUALITY

Too many online merchants are driving customers away in frustration. Here's how to assure your Web customers a quality shopping experience By Gary H. Anthes

Quality Advice From The E-Commerce Pros

To ensure the quality of your e-commerce operations, experts offer the following tips:

- Keep it simple but thorough, and resist the temptation to overengineer.
- Speed up development by getting customer input early and often.
- Do large-scale stress-testing and integration-testing.
- Insist on performance guarantees from key suppliers and be willing to pay extra for superb service.
- Tie compensation for your e-business employees to the performance of your Web services.
- Test your Web site with the tools your customers will be using, such as dial-in connections and low-resolution monitors.
- Consider spinning off your e-business as a separate entity.
- Don't neglect back-end processes like shipping.

AT DRUGSTORE.COM INC., there's one quality specialist for every software developer. "You can ship the wrong book, and the customer will be frustrated," explains Kal Raman, the company's chief operating officer. "But if we ship the wrong medication, it could kill the patient."

Few e-commerce ventures face that kind of pressure for quality. And clearly, not all companies are winning at the quality game. Although it's hard to say just how much outages at companies like ETrade Securities Inc., eBay Inc. and Charles Schwab & Co. really hurt their businesses in the long run, customer surveys show widespread dissatisfaction with many online operators.

In a recent survey of 2,500 households, The NPD Group Inc. in Port Washington, N.Y., found that fewer than one-third "agreed strongly" that they got accurate information when shopping online, and fewer than one-fourth said customer service responded quickly or understood their needs.

And in a survey of 51 of the most prominent Web shopping sites, Indianapolis-based e-commerce software company Sigma/Micro Corp. found that 61% provided no product availability information, 71% offered no ability to check an order's status, and 55% provided no e-mail acknowledgment of an order. "If you can't respond to customer expectations in real time, you run the risk of becoming e-toast," says Sigma Chairman Albert Langsenkamp.

Drugstore.com's quality specialists fall into two categories: technical people who assist in system testing and "customer interface" people who know retailing, pharmacology, health care and the like.

DON'T FORGET THE BACK END Raman says many companies do a good job presenting quality at the front end — the Web interface seen by customers — but neglect quality at the back end, where orders are processed. At Drugstore.com, licensed pharmacists approve all pharmacy orders twice — when they come in and just before shipment. And Raman personally reviews and responds to customer complaints, he says.

Steven Nevill, CIO at Ft. Lauderdale, Fla.-based Gerald Stevens Inc., which sells flowers and gift items both online and through retail stores, agrees that back-end processing is the Achilles' heel of many online shopping sites. "There's a get-that-first-order philosophy and not as much emphasis on how to satisfy the customer all the way through the transaction," he says. "It's a great site, and I can buy the product. But then it doesn't arrive, and when I call there's no one to talk to me."

Nevill says the problem often is poor integration between the new Web systems and older systems used for order processing, shipping and other back-end functions, usually because the two types of system are built and maintained by different groups in the company. That gives rise to disconnects, such as when a customer buys an item online but isn't able to return it to the company's mall outlet.

"You need to tie together all the systems that touch the customer," he says. "You want your customer — whether shopping online, calling an 800 number or walking into a store — to have the same experience. You want whoever is interacting with them to know everything about them, where they have been before, and be able to service them in the same way."

Back-end customer service at Gerald Stevens is

IT'S IMPORTANT to build quality into processes as well as the end product, says Camille Farhat, e-business leader in General Electric's Corporate Initiatives Group

NICK CARDILLICHIO

aided by an array of technology, including automated call distribution, interactive voice response and e-mail order confirmation, Nevill says.

SPEED VS. QUALITY Thomas R. Eisenmann, who teaches a course on e-commerce management at Harvard Business School in Boston, says senior management at companies about to launch commercial Web sites face two strategic questions. First, should they push for rapid growth, even if that means cutting a few quality corners? "The default is you should be going faster than you probably think you should," Eisenmann says.

It's a reasonable strategy to get something up quickly, then adjust and improve it as experience is gained, Eisenmann says. "It's hard to be critical of a Wal-Mart or a Toys R Us for wanting to get it right, but at the same time, they are losing ground," he says. "ETrade and eBay have both suffered many hiccups in terms of reliability, and it doesn't seem fundamentally to have hurt the trust in their brands."

The second fundamental question is how to organize the e-commerce enterprise, Eisenmann says. Its various functions — such as information technology, marketing and logistics — can be embedded in the firm's existing departments, or the whole enterprise can be spun off as an independent operation. Again, situations vary, but the default choice should be to spin it off, with a thought of reintegrating it later when it matures, he says.

E-SKITTISH? Eisenmann says corporate IT departments are often too risk-averse to keep up with nimble e-commerce start-ups. "It comes from years of having been late and over budget, and here's a wonderful opportunity to get criticized [again]," he says.

Four years ago, General Electric Co. launched its Six Sigma quality program. Its goal: No service or product may have a defect rate exceeding 3.4 per million. GE estimates it will invest some half-billion dollars in Six Sigma this year but will save more than $2 billion.

It takes a great deal of effort to achieve Six Sigma defect rates, but GE says it refuses to shortcut the discipline for its e-commerce initiatives. "We cannot relax that standard," says Camille Farhat, e-business leader in GE's Corporate Initiatives Group. "What we do [for speed] is press to get market intelligence earlier and get customers involved earlier so we aren't guessing."

It's important to see quality as something to be built into processes — such as software development — and not just into the end product, Farhat says. He also advises "designing for maintainability" — building systems for which the quality of content and technology can be sustained and enhanced over time.

Part of Farhat's job is to find and propagate "best practices" across GE's 350 business segments. "For example, someone has an easier way to do integration testing. We steal it and shamelessly spread it across the company," he says.

GE's no-compromise stand on e-commerce quality is the right one for today, says Daniel Todd, director of strategic marketing at Keynote Systems Inc., an Internet benchmarking firm in San Mateo, Calif. "Three years ago, it was easy to say, 'OK, let's make sure we have something out there and get first-mover advantage.' But today, you must have a quality product."

Todd recommends testing commercial Web sites with the primitive tools used by many customers, not the latest browsers, high-speed connections and high-resolution displays that developers use.

LOOK OUTSIDE IT FOR HELP According to Todd, Web site development teams increasingly include non-IT people, from marketing and other disciplines, and that's boosting quality. He says key people on the team should have a portion of their compensation tied to Web site metrics such as uptime and time to complete a transaction. These metrics can be pegged to the performance of competitors' Web sites, he says.

Quality assurance in IT has traditionally been focused early in the system development cycle, on the design and testing phases. But in the e-commerce world, it should be more of a continuous process, Todd says. That's because the operating environment is largely in the public's hands and, hence, unpredictable and uncontrollable.

The unpredictability of usage makes it imperative to do thorough, large-scale stress-testing, says Wing Wong, a partner at PricewaterhouseCoopers in Edison, N.J. "Performance and scalability — that's the hot, hot topic today," he says. "Companies think scalability is a size-of-the-box kind of problem, but there's a whole bunch of stuff that a bigger box won't solve."

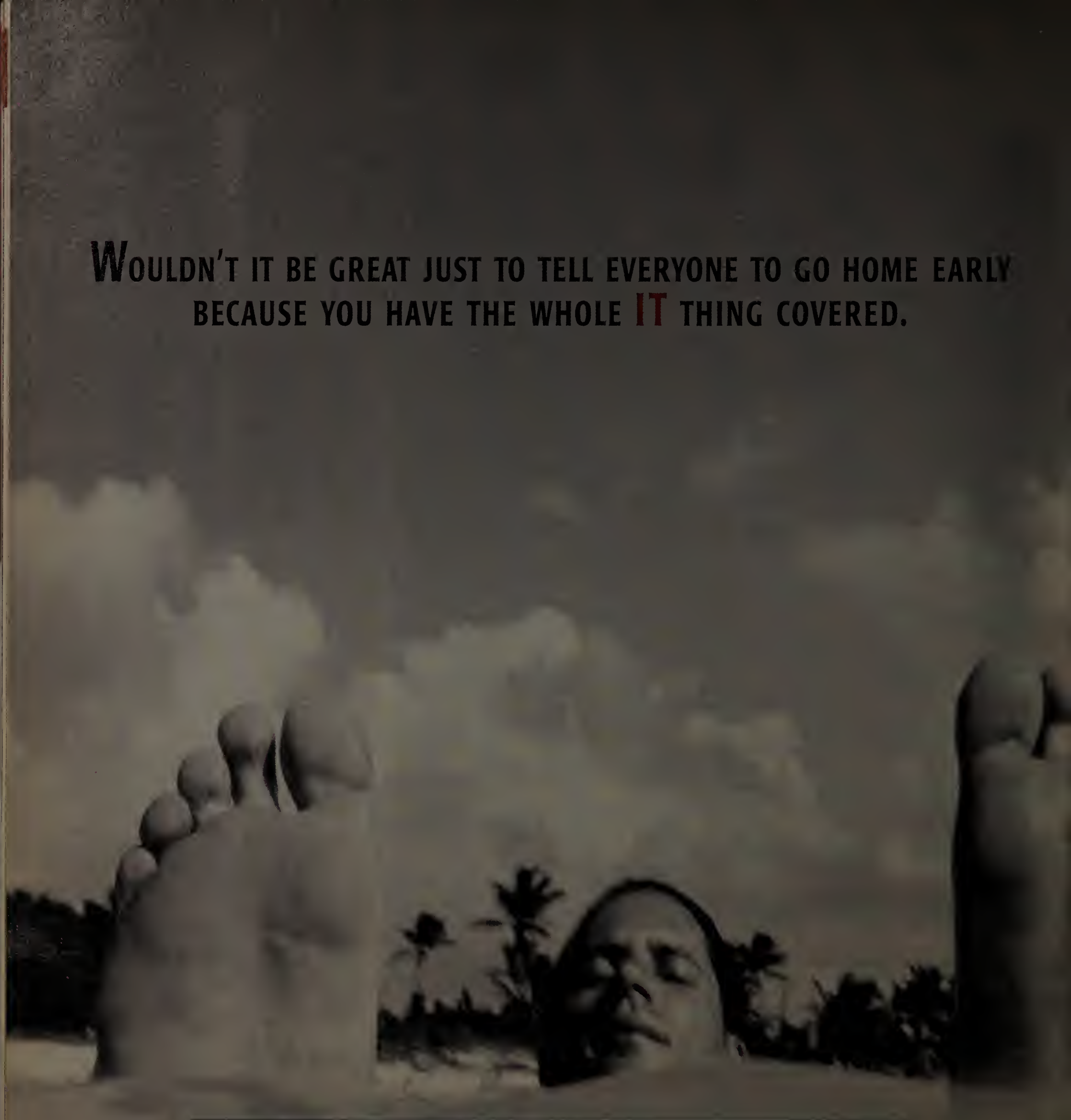
The other "stuff" is software. The complex interactions among browsers, application servers, operating systems and utilities require thorough stress-testing and integration-testing, Wong says, and companies often balk at the time it takes to do that right. He says companies should allocate one-third of their e-commerce development budgets to quality assurance, including testing, but they often earmark 10% or less.

Toysmart.com uses an outside quality assurance firm to review major Web site enhancements. Customer focus groups do the same. The company's IT department employs full-time quality engineers, and its marketing department also performs quality audits. "We have a lot of eyes on quality," says Mark Reese, chief e-commerce officer at the Waltham, Mass.-based online retailer.

The multidisciplinary nature of the best Web development teams should be reflected in a single point of management accountability, says Reese, who heads all functions that impact customer service, including Web site development, online content, merchandising, fulfillment and customer relations. "In most organizations, even most Internet organizations, those are split among multiple executives," he says.

Asked what advice he'd give a CIO just embarking on an e-commerce venture, Farhat says, "Start and end with the customer. That's it."

WOULDN'T IT BE GREAT JUST TO TELL EVERYONE TO GO HOME EARLY BECAUSE YOU HAVE THE WHOLE IT THING COVERED.



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Intel CEO: Don't Let IT Lead Way to the Web

Expect the unexpected from Craig Barrett. As Intel Corp.'s CEO, he carefully limited IT's role in e-commerce, then drove Intel from a nominal Internet presence to one of the world's biggest players, with current sales topping $1 billion per month. He's also an infrastructure czar who readily acknowledges that the current infrastructure is just too immature to handle the demands of an eBay Inc., and he's an Internet power player whose favorite use of the Web is to check how the trout are running near his Montana ranch. During a break at Gartner Group Inc.'s IT Symposium in Orlando in October, he talked with senior editor **Kathleen Melymuka** *about life in "the very best of all worlds."*

ANDY FREEBERG

WHO IS HE?

Craig Barrett, a former science professor at Stanford University, rose to the top of Intel despite having no formal business training. He has been a driving force in the chip giant's rise to being a major e-commerce player.

How did you organize the electronic business within Intel, and what is its relationship with information technology? We generated a Web presence four or five years ago: Intel.com. — the standard information transferral thing. We had been using the Internet to do training and to stay in contact with many small distributors of Intel products (about 45,000). But we weren't doing commerce with them. In late '97 to early '98, we decided to sell to our customers over the Internet.

When we decided to do e-commerce, we anointed a champion who was from our sales and marketing organization but who enlisted the support of IT, logistics and manufacturing, and the business units. She [wanted] to go live in six months — build on the infrastructure, the legacy databases, the current Web presence that we have, and put the security and business applications in place.

In your presentation at Gartner's symposium, you made a point that IT shouldn't "run the world" in e-commerce. Why not? I think naming a champion who had a cross-disciplinary reach allowed us to do this in a fairly efficient fashion. I think it would have been much more difficult if we had given it just to the IT organization or kept these organizations relatively separate or operating at arm's length. But by combining them very closely, I think we got the very best of all worlds.

But why not let IT take the lead in a coordinated effort? It's the danger of any organization that will optimize a situation to meet its needs. The Internal Revenue Service can optimize its operation, but it will not optimize it for its customers.

IT organizations operate typically by a set of metrics, but they're not external business- or customer-oriented metrics. And it's difficult to take an organization with an established set of performance metrics and then say, "Here's the new set."

By setting up this cross-disciplinary function and putting in businesspeople, we brought the business requirement very quickly to the top priority. IT was then just part of the solution, providing a partnership service, as opposed to causing IT to change their basic operation.

What's next? The next step is to expand it. At the front end, our goal was to sell to our customers. More recently, we've wanted to buy from our vendors using the same technology. I think the biggest challenge is going to be to modify all the internal processes in between such that they're operating at the same time cycle as the two ends are.

In a hypothetical sense, you have 24/7, real-time ability to commit product to a customer here and buy raw materials here. But if the internal planning cycle takes two weeks, wow, what have you got? Realistically, you need to attack all three in parallel.

When I read about electronic business, I find I'm often reading about server crashes. What's wrong? It's that you're putting mission-critical applications onto a backbone that was not designed as a mission-critical infrastructure. If you have a mission-critical, 24/7 infrastructure, you need to put a design on it that's "four nines" or "five nines" reliable. That just means 99.99999% of the time, it's up. That equates to five minutes of the year it's down. That's the way the telephone system is designed today. But computer infrastructures were not built to that same level of reliability. We're a work in progress.

What needs to happen for this to come together? You can't just take a desktop operating system and application and try to do mission-critical. You use a PC: Does your PC ever crash? Just scale that up and put in thousands of users and a big server.

Every crash you have is exasperating. EBay has been down, what? Two or thee times in the last six months? And every time they go down, their stock price slides.

It's the infrastructure. It has to be made robust and reliable. Everybody's working like mad on it. You need a hardware-software total-system solution and management capability to identify weak nodes in the network before they go down — before they overload — and put in more capacity or switch one thing out and put another one in. You need to have software that doesn't crash, as much as that sounds like an oxymoron.

If a company is starting fresh in e-commerce, I imagine they have fewer problems to deal with. They don't have the legacy stuff to deal with. But my advice to someone who's just starting is, Don't cut corners with your first implementation because you'll probably follow that forward architecturally and it could lead you down a wrong path.

Also, none of this push toward reliability and scalability detracts from the fact that it also has to be cost effective. You can build a redundant system today, but you'll probably go broke doing it. So you have to figure that out. You don't want to lock yourself into a totally uneconomic structure.

But nothing in life is easy, and this is a major sea change we're going through. That's why we pay the CIOs so well. They earn it. ◗

ANNE McCRORY/JARGON JUDGE

Enough to make my head SPin

I THINK I WAS in sixth grade when ESP was in vogue. It was cool and fun to see if you could tap your extrasensory perception to try to read minds or see the future.

Perhaps if I had been so gifted, I'd have known it was only a matter of time before that definition of ESP would be replaced with a technological one.

And now it has been. I just heard for the first time about an e-commerce service provider, or ESP. Add that to the growing family of SPs — ISPs, ASPs, even CSPs. I can hardly keep up. SP should stand for "Such a panoply."

As indeed there is. In an increasingly complex world, we all use services — maybe housekeeping or grocery delivery at home, or an Internet service provider (ISP) to get Net access and host the company Web site. Maybe we rent applications and let an application service provider (ASP) deal with the maintenance. Or we want to add e-commerce capabilities to our Web site, so we hire a commerce service provider (CSP) to handle the payment side of things. Any way you look at it, it's a booming business — and can be essential to freeing your people for the projects that will really make your business stand out.

But let's not applaud a whole new pot of alphabet soup. When most people see this many acronyms, their eyes glaze over. They think you're talking about something technical — probably networking (think IP, IPX, ISDN) or even development (in some circles, ASP stands for Active Server Pages). Service providers are a business concept, and not a complicated one at that. Acronyms don't reinforce that point.

They also prove to be increasingly meaningless. The services these companies offer continue to morph and grow as the technology and customers' needs change — and we know how fast that happens. ISPs don't offer just dial-up access anymore; they rent you server space for your Web site and e-mail and offer software so you can securely work with business partners over a private piece of the Internet.

Does any high-tech jargon leave you steamed? Or smiling? Tell **ANNE McCRORY**, former *Computerworld* copy desk chief and now news editor. Contact her at **anne_mccrory@computerworld.com.**

What room does that leave for ESPs? Maybe site-building expertise and experience in hooking up to your back-end systems to process and fill orders. But must you go to a CSP to integrate a payment system? Hmm. You've got me.

Much as these companies have sought to break off pieces of the market to call their own, the world is so volatile and companies so intent on keeping up that clarity gets lost in the process. I don't know if I need an ISP or an ASP or a CSP to get my job done.

In fact, I'd probably never look for a vendor by such a classification anyway — it would be a choice between whom do I know and whom do I feel most comfortable with. There are the AT&Ts, the AOLs and the fast-growing, well-financed start-ups. Probably any of them has a shot at meeting my needs.

Like so many companies in so many technology niches, they're just service companies. Let's keep it simple and call them that. If nothing else, doing so will keep people from being confused yet again when these acronyms take on their next-generation meaning. ◗

CONFERENCES

■ MACWORLD EXPO/ SAN FRANCISCO
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■ STRATEGIC MANAGEMENT 2000
(Two sessions) Waldorf-Astoria, New York, Jan. 11-12; Ritz-Carlton, Marina del Rey, Calif., Feb. 16-17
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■ THE 2ND ANNUAL KNOWLEDGE MANAGEMENT WORLD SUMMIT
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Moscone Center, San Francisco, Feb. 14-16
This first-of-its-kind conference focuses solely on the new Microsoft Corp. server operating system.
Cost: $1,195 by Jan. 17; $1,295 thereafter
Contact: IDG World Expo (part of International Data Group) in Boston, (800) 560-7612; e-mail:Windows2000expo@idg.com
www.windows2000expo.com

■ IT OUTSOURCING – WHEN, HOW AND WHY
Swissotel Washington — The Watergate, Jan. 25-26
For executives interested in the strategic and tactical implications of business process outsourcing. Also, a look at the latest outsourcing trends from a Conference Board survey.
Cost: $750
Contact: The Conference Board in New York, (212) 339-0345
www.conference-board.org

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Crystal Gateway Marriott Hotel, Washington, Feb. 7-10
The latest in technologies for enterprise voice communications.
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Contact: *Business Communications Review* in Westmont, Ill., (800) 227-1234 or (630) 986-1432; fax: (630) 323-5324; e-mail: registration@bcr.com
www.voicecon.com

■ METAMORPHOSIS 2000 EAST
The Peabody Orlando, Feb. 8-10
METAMORPHOSIS 2000 WEST
Hyatt Regency San Francisco, Feb. 21-23
Meta Group's view of what's going on and what's to come in information technology.
Cost: $1,095 for Meta clients; $1,595 for others through Feb. 1 (for either conference)
Contact: Meta Group Inc. in Stamford, Conn., (800) 945-6382 or (203) 973-6700
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When Knowledge Means Savings

Susan Palm believes that the team with the most information wins when the time comes to negotiate an IT purchase. And that strategy has paid off handsomely for Wells Fargo

BY RICK SAIA

KNOWLEDGE is power, and Susan Palm believes that the more you know when negotiating an information technology contract, the more clout you can wield and the more money you can save your company.

Like more than $200 million.

That's how much Palm and her 50-person contract services group has saved on IT purchases over the past four years for financial services giant Wells Fargo & Co. (The first three years were spent at Minneapolis-based Norwest Corp., which merged with Wells Fargo late last year.) Not bad for a company that expects to *spend* that much on IT this year alone.

ERIC MILLETTE

WELLS FARGO'S SUSAN PALM has helped save her company more than $200 million in IT purchases over the past four years

Reporting, Research Are Key

"I really believe good reporting [and research are] critical in doing good work," especially research about the company being represented across the negotiating table, says Palm, now a senior vice president at San Francisco-based Wells Fargo. Timing is also important to Palm. For instance, Wells Fargo initiates contract talks with key vendors after looking at their quarterly earnings. "If they're having a tough quarter, we'll go and try to deal with them" and create an opportunity that provides a good deal for Wells Fargo and a big score for the vendor. These vendors are living quarter to quarter, as far as Wall Street is concerned," she says.

According to Palm, there are two other key factors that help Wells Fargo get the biggest bang for its IT buck. First, the firm finds out if other divisions of the company need the same hardware or software products as a division whose needs are being addressed in a particular deal. Second, Palm says, the company must consider its future needs, especially if it plans to acquire other firms. The bigger the deal you can do, the bigger the discount you can win from a vendor.

It was that knowledge that helped Palm save Norwest more than $5 million on a big contract with a major software vendor in 1995 — at the end of a fiscal quarter for the vendor. At the time, explains Palm, she wanted to show Norwest's senior management how much money the newly created contract services group could save the company. Palm and her team knew that Norwest was about to acquire other businesses, most notably the assets and data center of Prudential Insurance Company of America's mortgage division. In the deal, Norwest won upgrades to accommodate the Prudential acquisition and others over several years.

Companies are leaving millions of dollars on the table "by not effectively managing the technology acquisitions process," says Ditka Reiner, president of Reiner Associates, a San Raphael, Calif., contract negotiation consultancy. That's why someone of Palm's caliber, who understands business and IT market trends, can be a big help, Reiner says. "It teaches other people what's possible."

Gauging Merger Activity

Palm's team looks at more than a vendor's financial statements; it keeps its eyes open for merger activity. When a merger of IT vendors is announced, Palm says, "we try to do a deal with the company that's being purchased prior to the actual merger. And let me assure you, they're trying to do deals with all of their major customers as well" for any one of a number of reasons, such as boosting their market capitalization before the buyout takes place.

Another key part of Palm's strategy: having a team of negotiators on her side. A typical Wells Fargo negotiating team comprises four people, each with a different area of expertise: someone who understands Wells Fargo's business needs, another who has a strong command of technology, someone who is a strong negotiator and someone from the contracts staff — generally an attorney — whose strength is in contracts language.

Meanwhile, the vendor may be represented only by a sales representative and an attorney, Palm says. That blend of expertise for Wells Fargo helps "ensure that we get the very best deal," because each person representing the company addresses a different aspect of the total cost of whatever Wells Fargo is buying.

Between Lawyers and End Users

In most organizations, adds John C. Rinas, a vice president in Wells Fargo's contracts division, someone negotiating a contract may go to the law division to review terms and conditions. "We tend to be somewhere between the law division and the end user," he says.

Bob Reed, a client manager at IBM, has conducted three or four major negotiations with Wells Fargo and Norwest over the past four years. He describes Palm's group as tough but fair. "When you sit across the table from them, you know they've done their homework," he says.

Reiner and Rinas say Palm connects well with people, especially her colleagues. "Susan recognizes the contribution that people make," says Rinas, who has worked with Palm since the inception of the contract services group in 1995. "She spends more time with the people who are up-and-coming and need mentoring." But while doing that, Reiner adds, Palm also gives them autonomy, and she listens. "She really gets their confidence."

What kind of people does Palm look for to represent Wells Fargo at the negotiating table? "I need people who are creative, who think really well on their feet and have tremendous self-confidence," she says. Working on the contracts team requires good listening skills and the ability to take in information, process it and come back with a response. "To put all of that pressure on one individual person I just think is impossible," she says.

Reiner says Palm does a "wonderful job" of working within the Wells Fargo organization and adds that Palm's team approach works best when negotiating a large purchase. And, in a fast-moving IT environment, maximizing your IT budget can give you a big edge in your marketplace, she adds.

"If you can save your company $5 million off the bottom line," Reiner says, "imagine how much more money your company can save on technology." ◗

AT A GLANCE

Wells Fargo & Co.

www.wellsfargo.com

Headquarters: San Francisco

Market: Financial services for businesses and consumers

Revenue (1998): $20.5 billion

Net profit (1998): $1.95 billion

Five Rules for Negotiations

Susan Palm, a senior vice president at Wells Fargo, offers these five pieces of advice for negotiating with IT vendors:

- Ensure that you have someone at the negotiating table who understands the vendor's business and marketplace.
- Focus on the total cost of ownership of the product, not just the initial purchase price.
- Don't compromise terms and conditions for price.
- Don't burn your bridges with a vendor, because you may have to negotiate again with that vendor three years down the road.
- Don't let your emotions get in the way.

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of us, in one way or
another, as we progress
through the 21st century.
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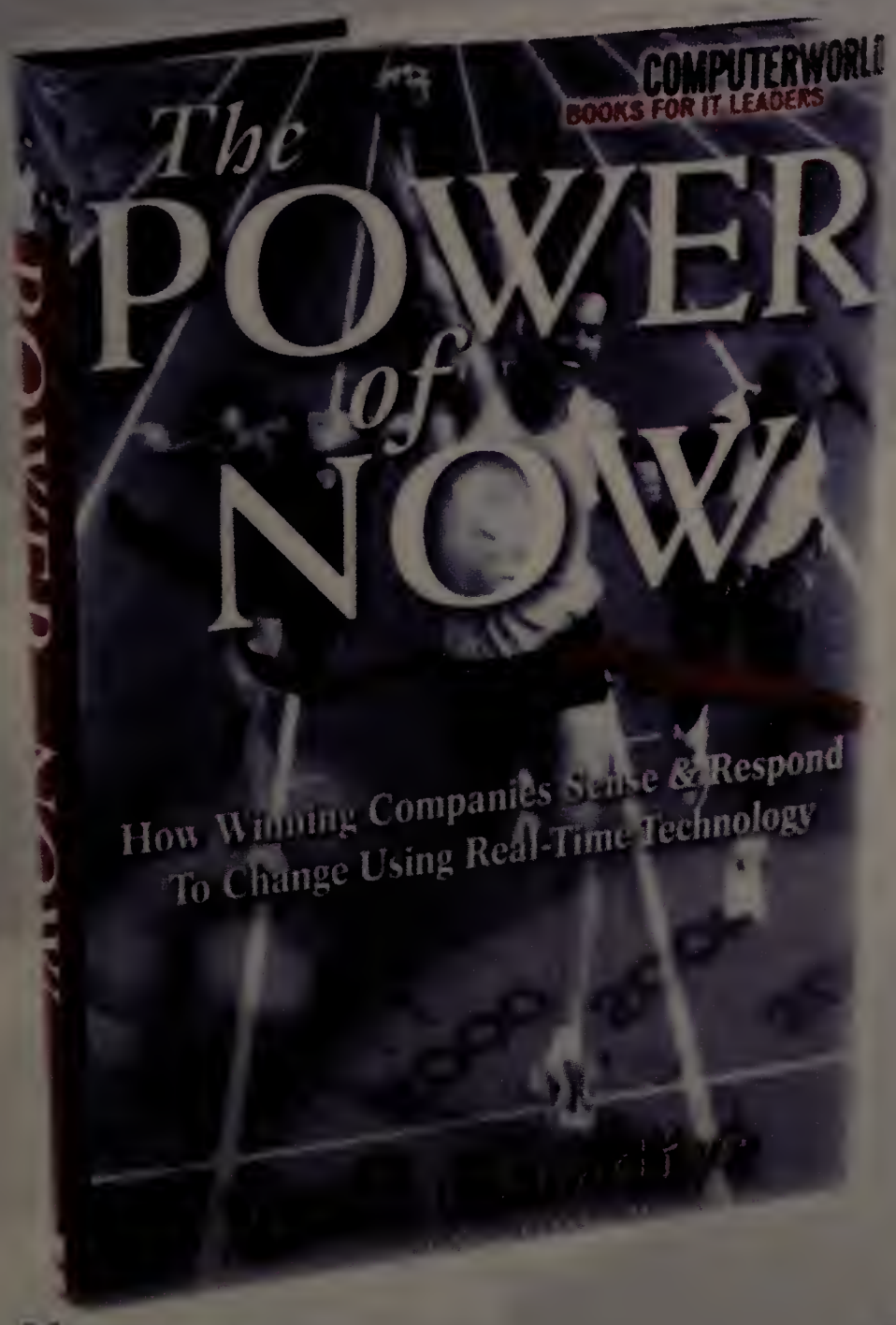
and about success in an
increasingly global
networked society"
Scott McNealy, CEO, Sun Microsystems



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collaboration of its
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QUICK READ

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Success in e-business requires real-time response. The winners grab opportunities fast or watch them vanish in Internet time. They use fast dependable, proactive information exchange. Reliable e-business tools that allow customers, sales teams and supply chains to receive critical information. Immediately, as soon as transactions occur. The "real-time, event-driven" vision that enabled these technology breakthroughs is explained by TIBCO's President Vivek Ranadivé in his new book *The Power of Now*. It's part of the Computerworld Books for IT Leaders series. So think fast, pick it up at any major bookstore or on *Computerworld.com*.

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Disintermediation/Reintermediation

BY JULIA KING

THANKS TO THE near-ubiquity of the Internet, just about any company that wants to can sell its products and services directly to consumers and businesses online. And many do, because cutting out intermediaries — otherwise known as disintermediation — can mean bigger profits and greater access to valuable customer information.

At least theoretically.

But cutting out the middleman also can mean new kinds of problems, such as figuring out how to fulfill onesie and twosie orders from consumers, setting up new customer-service centers and dealing with backlash from retailers and other spurned channel partners.

Levi Strauss & Co. didn't score any points with its original e-commerce strategy, which shut out retailers from selling its blue jeans and other clothing online. Initially, Levi Strauss thought it wanted to keep the cybermarket to itself. But less than a year later, the $6 billion manufacturer, which had invested several million dollars in its online effort, abruptly changed course. In October, the company announced that it would quit direct sales on the Web and leave online selling of its clothing to retailers like J. C. Penney Co. and Macys.com. It seems the manufacturer just couldn't generate enough online sales to offset its considerable online costs.

So, say hello to "reintermediation."

"Levi's is a perfect example of a manufacturer realizing it just didn't have the channel power it thought it would on the Web," says Gene Alvarez, an analyst at Meta Group Inc. in Stamford, Conn.

Rethinking Web Strategies

In a nutshell, using the Web to cut out the middleman isn't turning out to be all it was cracked up to be, according to Mike Bernstein, an analyst at Gartner Group Inc., also in Stamford. Consequently, more companies are rethinking their online strategies.

"The siren song of disintermediation is a powerful force that few companies have been able to resist," Bernstein says. "However, the sight of numerous battered ships among the rocks is causing an increasing number of companies to think twice before selling directly to customers."

In fact, Gartner predicts that more than half of all companies now building or maintaining direct-to-customer Web sites will abandon them over the next three years. Instead, they will rely on, among other things, new Web-based intermediaries that bring buyers and sellers together in new ways. In the business-to-business arena, these include the ever-increasing number of industry-specific digital marketplaces, such as PaperExchange.com and e-Steel.com.

New Business Models

Disintermediation is already taking a hit on the business-to-consumer front, where new business models, such as cobranding and digital channel management — as opposed to channel cannibalization — are beginning to take hold.

OfficeDepot.com, for example, cut a deal earlier this year with Hewlett-Packard Co. under which it could sell HP's Series 2000 printers exclusively for a short period of time, giving it a head start over its competitors in the retail channel. In exchange, OfficeDepot.com, which is one of HP's largest retailers, sent key marketing and customer data back to HP.

Another example is Minneapolis-based 3M Co., which, rather than compete with resellers, is working with them to create Web-based cobranded showrooms for its line of ergonomic products and accessories. The online showrooms allow 3M to control how its products are portrayed and to gather valuable data about users of its products.

Resellers, meanwhile, handle all consumer transactions and product fulfillment, both of which are traditional stumbling blocks for manufacturers unaccustomed to shipping smaller orders.

Still another example is HomePoint Corp., a start-up online retailer in Greenville, S.C., which has signed up more than 200 furniture makers and dealers to participate in its new e-commerce model. Under the model, manufacturers, retailers and HomePoint all earn a profit from online sales that are executed via HomePoint's Advantage Network.

"We realized from the start that you have to be able to deliver the product, handle returns and have a place for customer service," says HomePoint CEO Mike West.

That's one of the key reasons why HomePoint, a virtual company, opted against competing directly with brick-and-mortar furniture retailers. Instead, it enlisted them as distribution and fulfillment centers.

Ethan Allen Interiors Inc., a Danbury, Conn.-based furniture manufacturer with 310 stores, has adopted a similar model for moving sales online. Visitors to its Web site will soon be able to buy furniture and other home accessories online. But the items will be delivered and serviced by the company's stores, which are electronically connected via an extranet. In exchange, retailers will receive 10% of online sales receipts.

This strategy will be put to the test later this year when Ethan Allen launches its redesigned Web site, says CEO Farooq Kathwari.

Kathwari says the company launched its first Web site four years ago, primarily as a marketing tool. Back then, Ethan Allen — like so many other manufacturers — was reluctant to sell directly online for fear of alienating its 250 independently owned stores, which accounted for 60% of overall sales.

"A few years back, not one of us thought we'd be doing what we're doing today with the Internet," Kathwari says. "It's been an education process."

DEFINITIONS

Disintermediation refers to cutting out the middlemen in e-commerce transactions. Examples include General Motors Corp. bypassing dealerships to sell cars directly to consumers, and insurance companies skirting their own agents to sell products and services.

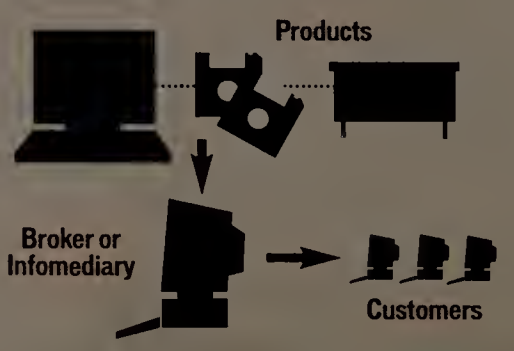
Reintermediation refers to using the Internet to reassemble buyers, sellers and other partners in a traditional supply chain in new ways. Examples include New York-based e-Steel Corp. and Philadelphia-based PetroChemNet Inc. bringing together producers, traders, distributors and buyers of steel and chemicals, respectively, in Web-based marketplaces.

How Disintermediation Works

A manufacturer bypasses the middleman to sell directly over the Web to the consumer.

How Reintermediation Works

A middleman, called either a broker or an infomediary, gathers information from two or more suppliers on pricing and availability of products, then relays that information to would-be customers.



■ *Are there business terms you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.*

DR. SHAHLA BUTLER | IT LEADER

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As Director of the AMS Center for Advanced Technologies, Dr. Butler's mission is to increase our understanding of emerging technologies. "Ours is a commitment to keeping AMS clients on the frontier of IT practice," she says. "To address technologies that will fundamentally change the business landscape."

For example, her team's initial XML research yielded an intelligent agent that collects relevant information across multiple sources then synthesizes, categorizes and disseminates it based on a user's specified interests. "Our Next Generation Enterprise and Business Intelligence & Knowledge Management labs are collaborating now to evaluate emerging non-numeric mining tools," she proudly reports. "We'll be releasing the results soon."

And where does Dr. Butler gain her understanding of emerging technologies? From her peers, at conferences, from the Web and from *Computerworld*. The Newspaper for IT Leaders.

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Dear Career Adviser:

I have more than 10 years' experience designing and implementing complex software applications. My experience involves all aspects of the software development cycle: requirements analysis, architectural design, implementation, maintenance and quality assurance.

My technical experience includes electronic data interchange (EDI) and compiler design, Unix, C language, Erwin, Perl, Java and other application tools and packages.

I feel e-commerce is just the latest buzzword being applied to a particular set of software design skills and that my skills in database design, complex system design and Web design are valid for e-commerce lead development jobs. How do I stack up as a candidate in a firm focused on Web services?

— EXPERIENCED ENGINEER

Dear Double E:

According to Tom Harper, interim chief technology officer at Basement.com in San Francisco, you sound like a good team or development lead or integration specialist who likes to be hands-on in implementation. Your solid experience in C language, data conversion, EDI and general systems integration will also stand you in good stead, Harper says.

However, you aren't specifically experienced in widely used e-commerce technology platforms or the enterprise resource and financial applications that are popular at the enterprise level, and you must learn those here and now, says Harper.

Moreover, although you appear to have switched technologies relatively frequently with little apparent difficulty, your Unix development days are long behind you. While some start-ups are Microsoft shops, many are switching back to Unix when they need to build a solid architecture.

When interviewing for e-commerce lead development jobs, present yourself as a self-starter who is actively acquiring and using newer skills and testing them out in real-world environments. Then cover your wealth of development experience and how you have successfully met rapid project deadlines.

Harper says that to take a more senior role, you'll have to show that you've been a project manager, can write a specification, have architected systems and possess excellent communication and leadership skills.

Dear Career Adviser:

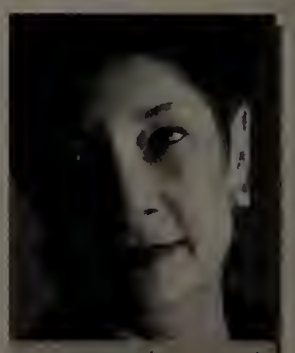
I'm 33 years old and completing a 20-month course in Internet programming at a technical school. Some of my associates say that employers prefer college over technical school and that I'll have difficulty locating a job without a degree. Does a certification diploma hold any weight, or should I continue for an associate's degree?

I'm also concerned about the money I'm spending on my education and its real-world payback. Does the school have to help me find work?

— LATE BLOOMER

Dear Bloomer:

In general, most accredited technical schools offer certification or an associate's degree or higher. They may also offer a process to transfer credits to another institution of higher learning. Solid organizations also partner with companies and offer placement programs that guarantee assistance to students. You can check out such programs by asking to call graduates.



FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at **www.computerworld.com/career_adviser.**

Resist the temptation to leave school for an enticing curriculum-interrupting job. A degree generally adds countless dollars and a significant level of more interesting and higher-level opportunities in the long run.

Dear Career Adviser:

I'm part of a large Fortune 500 consumer products company that has yet to embark on an Internet implementation, and I'm simply tantalized by all these new companies working on e-commerce and other new and exciting strategies. I have good skills, particularly in data warehousing and data mining, and am constantly called by recruiters advertising the newest this and that type of start-up.

How can I evaluate these opportunities? I'm in my 30s with a young family, and I'd love to send my children to great schools without having to save every cent to do it.

— WILD WEST OR WAIT

Dear West:

You'll need to do some homework to understand how a dot-com prepublic company stacks up against your current employer, a Fortune 500 company with earnings, revenue, a brand name and a substantial research and development budget — and hopefully some exciting work along the way.

While exciting, many small companies are fragile, says Haywood Kelly, an analyst at Morningstar Inc. in Chicago. Many young companies — especially Internet firms — are tearing through money rapidly with no hope of generating profits soon. Does the company generate cash flow from operations or is it selling shares to investors to cover expenses and growth?

Be especially wary of "me-too" companies — companies that are second or third (or even later) to market with a good idea, says Kelly. Come a recession, the second- and third-tier companies will wither on the vine. ◗

BRIEFS

Property Taxes

California's San Diego County has become perhaps the first county in the U.S. to allow residents to pay their property taxes over the Internet. Beginning late last month, taxpayers were able to sign on to the treasurer/tax collector's Web site (*www.sdtreastax.com*) and follow the prompts to pay their taxes using electronic checks. There's a $3 processing fee for using the system.

Big Mapping Deal

The largest mapping and geospatial information organization in the world, the National Imagery and Mapping Agency in Bethesda, Md., has purchased geographic information system software and maintenance services for $22.4 million from Environmental Systems Research Institute Inc. in Redlands, Calif.

New Head at Exxon Mobil Unit

The recently created Exxon Mobil Corp. has named G. L. "Jerry" Kohlenberger president of the new ExxonMobil Global Services Co., to be located in Dallas.

Global Services will be responsible for information systems, procurement and real estate in the company, which resulted from the merger of Mobil Corp. and Exxon Corp. last month.

Clinical Care

Baltimore-based Johns Hopkins Medical Institutions has licensed San Francisco-based McKesson HBOC Inc.'s InterQual acute care, rehabilitation and quality-monitoring management tools. They will be used to review clinical care patterns and document procedural quality.

Overseas Deal

Electronic business applications vendor BroadVision Inc. in Redwood City, Calif., announced it will acquire Swiss systems integrator Fidutec Information Technology SA in Lausanne. BroadVision said the acquisition will significantly extend its presence in the European financial services arena.

Pharmacy Link

New York-based Cambridge Pharma Consultancy Inc. has launched PharmaQuery.com, a consulting service that offers pharmaceutical firms up-to-date information on pricing and reimbursement systems in 14 countries. It also offers updates on legislative issues affecting the industry.

Vendor Acquisition

Altra Energy Technologies Inc., a Houston-based vendor of software for electronic trading and risk management in the energy market, last week acquired Unified Information Inc., a Kirkland, Wash.-based vendor of real-time scheduling, management and settlements software for electric power companies.

Post-Y2K Spending Up

With year 2000 projects behind them, retail financial service institutions will bolster information technology spending on strategic initiatives from the normal 15% to 20% of their overall IT budgets to 26% to 27% next year, according to Meridien Research Inc. in Newton, Mass.

IT spending by banks and other financial services companies next year is expected to reach $33.2 billion worldwide.

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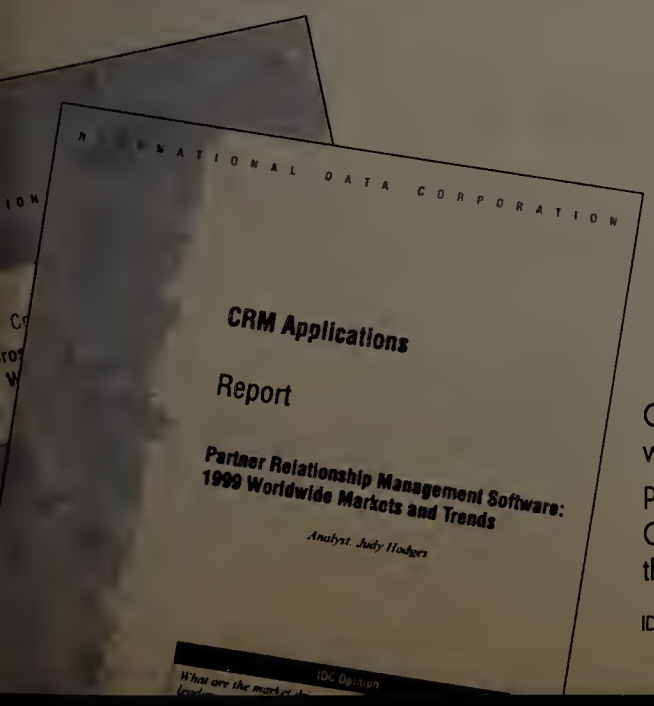
IDC's market research about PRM solutions can help you make smart strategic decisions, go to market effectively and build share by exploiting this growing market opportunity! IDC does this by providing you with in-depth market research, analysis and advice on cutting edge trends in the PRM market. IDC just released new research findings in this area so take advantage of this latest market research before your competitors do!



"PRM Solutions are gaining traction in the marketplace as companies now realize that Web-based channel automation solutions can increase their sales and competitiveness."

Judy Hodges, Director of IDC's CRM Research

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TECHNOLOGY

FRILLY NOTHINGS, THIN CLIENTS

Women's lingerie vendor Frederick's of Hollywood had a common problem: giving workers in a branch office access to both Windows and AS/400 applications. By using Windows-based terminals instead of conventional PCs, the company is saving on hardware and support costs. ▸ 61

EASIER HOOKUPS FOR NOTEBOOKS

A notebook computer is great until you have to dive under your desk and fish for wires to hook up all your peripherals. Xircom's PortStation and Mobility Electronics' EasiDock take different but attractive approaches to simplifying the process. ▸ 61

HACKING DVD

Security experts say the mistakes made by DVD manufacturers could bedevil any company trying to protect intellectual property over the Web. Among the lessons: Don't count on weak proprietary security algorithms. ▸ 60

MICROPAYMENTS RETURN

A new generation of start-ups tackles the challenge of accepting micropayments over the Web. ▸ 66

EVIL-CODE MYTH

Here's another year 2000 myth you can put to rest: that malicious outsourcers will use year 2000 repairs as a cloak to hack your mainframes. Contributing writer Deborah Radcliff reports that the sequential nature of mainframe code makes it difficult to hide the Trojan horses (executable code) hackers might try to implant. ▸ 60

EXEC TECH

Your spouse just got a new job halfway across the country. You have to research everything from school systems to home prices — fast. A new generation of Internet-based relocation tools and services range from bare-bones sites that help you find information, to cost-no-object services that set you up with luxurious temporary digs. ▸ 64

QUICKSTUDY

The good news: The JDBC programming interface makes it easier for Java programmers to connect their applications or applets with databases. The bad news: Programmers must still create their own SQL queries, which is a challenge because Java doesn't include any visual tools for doing so. ▸ 65

THE MATCH GAME

ITsquare runs a Web-based service that matches corporate development managers with more than development firms looking for work. ▸ 62

MORE

Exec Tech 64
Flashback 70
Skills Scope 72

MICHAEL LLEWELLYN

SUPERCOMPUTER data mining helped Ken Chatfield of Western Digital subsidiary SageTree understand disk drive failure trends and cut unnecessary product returns

SUPERCOMPUTERS TACKLE REAL LIFE

SUPERCOMPUTERS ARE SHOWING UP in unexpected places these days, performing functions such as analyzing loan risks and sifting through transactions for credit-card fraud. Their strengths are data mining and visualization, but most IT organizations still lack the specialized tools and skills to take advantage of supercomputers' parallel processing capabilities.

68

DEBORAH RADCLIFF/HACK OF THE MONTH

Evil-code-fix myth

EVERYONE'S READ the stories: Sinister Y2K programmers are hiding Trojan horses (executable code) in remediated Cobol code so they can come back under the pretext of Y2K chaos and steal corporate secrets, transfer funds — you name it.

Well, for the most part, you can relax. While feasible, the threat is overblown. You simply can't hide mystery code in Cobol like you can in a desktop operating system. Because Cobol code is sequential — unlike desktop systems — the best you could do is camouflage the code by breaking up the program and stashing it in different sequences. This change in the sequence would make it easy to catch the hack, said Michael Ferguson, a Cobol applications programmer at Oregon Mutual Insurance Co. in McMinnville, Ore.

Besides, mainframe systems are loaded with different programs, partitions and access controls. Combined, these make it pretty difficult for an evil Y2K coder to get the machine to do his bidding come year 2000. The only way the remediator could do this is if he had been granted access to both the mainframe and the desktop systems within the organization. And most organizations have granted only limited mainframe access because the mainframe is where most outsourced Y2K code work is done.

In addition, the Trojan horse would need to make a tunnel from the mainframe to the PC and a path from the PC to the Internet. "You'd have to be a supremely diverse technologist with a Cobol application, client/server systems programming and protocol communications background," Ferguson says.

However, there are many mainframe applications that do talk directly to the outside world through different avenues. In such applications, there could be hundreds of places you could fool with mainframe code to let an attacker in remotely, says "Tweety Fish," a white-hat hacker with the hacking group Cult of the Dead Cow.

DEBORAH RADCLIFF is a *Computerworld* contributing writer in Northern California. Contact her at **derad@aol.com.**

"Say, for instance, you had an automated [mainframe] phone support system that needed [Y2K] updating," Tweety Fish says. "It would be trivial for someone to add some code that lets you dial into a voice line with a modem and connect to a shell on that machine."

While the remote possibility of evil Y2K Trojans does exist, it all boils down to what type of access you gave your Y2K programmers, says Ferguson.

But if you're still concerned, follow Tweety Fish's advice: First, ask your Y2K team members how much they trust their Cobol outsourcers and what privileges those programmers were granted. And if you've got the time, examine your cleaned Y2K code for malicious streams — particularly in mainframe applications that talk to the outside world.

Rather than worrying about attacks from the inside, you'd do better to brace against the rash of Trojan horse-based denial-of-service attacks, self-replicating worms and viruses expected to come in over your e-mail to erase hard drives on Jan. 1. ◗

Flawed Copyright Protection Puts New Spin on DVD

Possible DVD audio hacking a concern

BY ANN HARRISON

Despite the defeat last month of a content scrambling system (CSS) intended to keep consumers from copying digital video discs, makers of DVD audio products say they're developing a new system to prevent the duplication of copyrighted audio material.

But critics of the plan say such copyright protection schemes are flawed, doomed to failure and should serve as a warning to other industries.

Matsushita Electric Industrial Co., which makes Panasonic brand products, said it's expecting a six-month delay in the launch of its DVD audio products because of demonstrated weaknesses in the CSS for DVD movie discs.

CSS was broken last month with a Windows utility called DeCSS, developed by open-source Linux programmers who were frustrated by the fact there was no DVD movie support for the Linux operating system. While the developers were working to create a DVD player for Linux — not intending to pirate DVD movie content — DeCSS has been perceived as a piracy threat to the owners of the copyright.

"Because of the hacking on DVD video, industry people are worried about the possible hacking on DVD audio, and so people are talking about much stronger protection," said Yoshihiro Kitadeya, a spokesman at Matsushita. "Matsushita will propose a new system of copy protection with a much stronger key and new encoding system."

New Protection System

Matsushita, together with Toshiba Corp., Intel Corp. and IBM, developed the CSS2 format intended to secure DVD audio. Kitadeya said Matsushita and its partners are now working on a successor to CSS2, with a stronger key and a new encoding system that could be proposed to the DVD forum for standardization.

But a number of computer security experts, including Bruce Schneier, chief technology officer at Counterpane Internet Security Inc. in San Jose, noted that the CSS security model is fundamentally flawed.

Schneier pointed out that CSS uses a 40-bit encryption key, designed to comply with U.S. government export regulations, which uses a weak proprietary algorithm instead of stronger public algorithms.

But even if the encryption were stronger and DVD hardware players that plug into televisions and software players downloaded to a PC, all have their own unique key that unlocks the encryption key on the DVD, Schneier said. Each DVD has 400 copies of the same decryption key, each encrypted with every unlock code needed for each player. If one unlock key is compromised, every DVD can be decrypted.

According to Schneier, the content protection technique is unsound also because the DVD material must be decrypted to be viewed or heard. DVD software manufacturers try to disguise the decryption key and playing program with software obfuscation techniques. But debugging tools are capable of capturing the unencrypted content or reverse-engineering the algorithm and seizing the key.

Claim Disputed

Akira Kadota, another Matsushita spokesman, said the company can't reveal the details of the strengthened copy protection system now being developed by a company called 4CC Entity LLC, but he disputed the claim that the CSS system is flawed.

Kadota said the system failed because one of the licensee DVD software companies was careless in managing keys. He added that there are no plans to provide a new algorithm or tamperproof hardware. ◗

AT A GLANCE

Lessons Learned

- Encrypted copyrighted content can be captured by software tools when it is revealed in plain text.
- Debugging tools can reverse-engineer algorithms and get encryption keys intended to secure content.
- Tamperproof hardware can help but isn't foolproof.
- Proprietary algorithms are often weak.
- Making reverse-engineering illegal won't stamp out the creation and distribution of such tools on the Internet.
- Technical solutions to legal problems are problematic at best.

MOREONLINE

For resources such as FAQs, books and articles related to DVD, visit our Web site.
www.computerworld.com/more

Plug It In! Docking Stations Simplify Hookup to Peripherals

Xircom and Mobility take different, but attractive, approaches

BY RUSSELL KAY

Have you ever noticed how many kinds of connectors there are on a computer? And how they're always tucked away at the back, where they're hard to reach and where you can't see what you're doing? Docking stations simplify the task of connecting a laptop to a network, external monitor, keyboard, mouse and other desktop peripherals. Until now, docking stations have been designed only for specific models of laptops, and they weren't usable across brands or models.

Several new products on the market address this problem head-on. The most ingenious and attractive is the **PortStation** from Thousand Oaks, Calif.-based Xircom Inc. (*www.xircom.com*), which consists of two end caps connected by your choice of up to six different snap-in modules. The whole unit connects with a Universal Serial Bus (USB) cable to your PC or laptop and offers 10M-bit/sec. Ethernet, DB9 serial, Personal System/2 mouse and keyboard, parallel connectors and a four- or seven-port USB hub.

REVIEW

If something you've plugged in needs more power than your PC's USB port can provide, a red light on the PortStation end cap alerts you to plug in the included AC adapter. Further snap-in modules in the works include a 56K-bit/sec. modem and an Integrated Services Digital Network adapter.

What you get in this package is almost every kind of connection you might want — lacking only video and sound — and you can put it where it's convenient. This can be especially handy if you have several devices (such as cameras, PDA cradles or scanners) that you need from time to time but don't want to keep connected.

But the really impressive part of this package is that it's wrapped in a world-class industrial design: It's handsome, the modules snap together and apart easily and status lights tell you what's working.

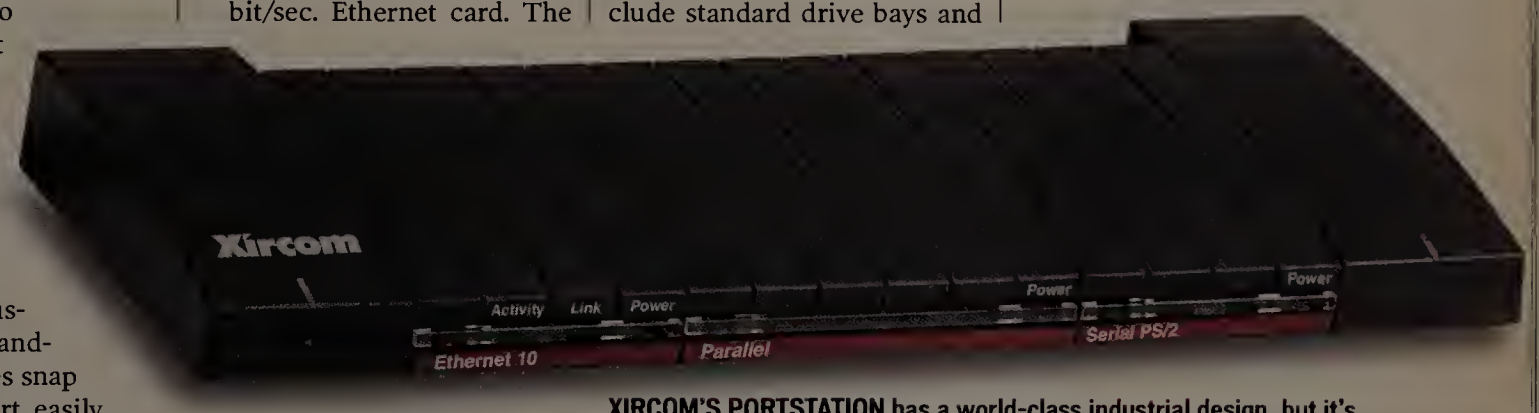
There are but two drawbacks. One is that its Ethernet capability is limited to 10M bit/sec., and the second is that it isn't cheap. A configuration with parallel and serial PS/2 connectors, the Ethernet connection, four USB and two DB9 serial ports and end caps retails for $487.

After playing with the PortStation for a couple of weeks, I went to Comdex and found someone else who had a similar idea but took it in a slightly different direction.

Mobility Electronics Inc. in Scottsdale, Ariz., which has previously made conventional docking stations for laptop PCs, has created and patented a new technology that makes it possible to extend the Peripheral Component Interconnect (PCI) bus over a relatively thin 15-ft. cable.

Mobility's **EasiDock** 1000 has virtually all the connectors I listed above for PortStation, plus an autosensing 10/100M-bit/sec. Ethernet card. The extra speed is made possible by the new technology. This EasiDock connects via a PC card adapter. While it isn't as attractive as Xircom's unit and isn't modular, this more capable package sells for $299, which is significantly less than the PortStation configuration. Mobility has three other units: two higher-end universal docking stations that also include standard drive bays and PCI slots, and a nonmodular USB unit ($129, or $179 with network card) that competes directly with the PortStation.

If you have a very specific, need, the Xircom product lets you get just what you require. Mobility offers a more full-featured docking capability for laptops, and its USB unit is an economical way to extend the standard connectors. Depending on your workspace, one of these units will probably fit in better than the other. ◗



XIRCOM'S PORTSTATION has a world-class industrial design, but it's expensive and has a maximum Ethernet capability of 10M bit/sec.

MOBILITY ELECTRONICS' EASIDOCK may not be modular, but it provides extra speed with an autosensing 10/100M-bit/sec. Ethernet card

Frilly Nothings, Thin Clients

Terminals cut costs for clothing retailer

BY DOMINIQUE DECKMYN

Thin clients may not have lived up to the initial hype, but at Los Angeles-based clothing retailer Frederick's of Hollywood, Windows-based terminals are delivering considerable savings and preventing support headaches.

When Frederick's moved its customer service department from Los Angeles to Phoenix this summer, the company needed to equip 50 workers with a new desktop system. They had been using green-screen terminals to access Frederick's AS/400-based order-taking and fulfillment application from CommercialWare Inc. in Natick, Mass. But Frederick's also wanted its customer service staff to be able to access Office 2000 applications and the company's Web site and respond to e-mail from the same system.

PCs equipped for the task would have cost $1,500 and required two support workers on-site in Phoenix, said Joe Butler, director of information technology operations at Frederick's.

Instead, the company opted for $750 Windows-based terminals from Wyse Technology Inc. in San Jose. The terminals access applications on a dual Pentium II Xeon server running Windows NT 4.0 Terminal Server Edition in California.

The company said it didn't consider Java-based network computers because it wanted a thin-client machine that could run Windows applications.

The Phoenix site has one support professional who handles both the phone and IT systems. The Phoenix and Los Angeles sites are connected over a 1.5M bit/sec. frame-relay network.

"We got the WinTerms on a Friday, we set them up on the desktops over the weekend with two people, and it was operational on Monday," said Butler. Connecting the NT server with the company's AS/400 server was as easy as entering the AS/400's IP address, he said.

Butler did experience some difficulties with a printer driver that blue-screened, or crashed, the server, but that was solved with a work-around posted on Microsoft Corp.'s Web site.

Small but Growing

The enterprise thin-client market, while small, is growing quickly:

- **305,000 thin clients were shipped to enterprise markets in the first half of this year, up 83% from the same period last year.**
- **Wyse is the market leader, with almost 39% of shipments and 37% of revenues.**

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Frederick's is evaluating Windows 2000, which it hopes will make it easier to manage which users have access to which applications on the server. But when Frederick's decides to make the move to Windows 2000, the terminals themselves won't have to be touched.

Frederick's has about 170 PCs in its Los Angeles offices running Windows NT Service Pack 5. About half of those could be replaced by terminals, but "it's a hard sell for users," Butler said. "[Therefore] the principle is we would [give terminals] to new users, but we would not take people's PC away." ◗

MOREONLINE

For resources on thin-client computing, visit our Web site.
www.computerworld.com/more

Start-up Finds Success In Making IT Matches

ITsquare outsources the tedious business of finding development, integration talent

BY LEE COPELAND

KENNETH PAUL wanted to hire a game developer. Yet the marketing director at inonMedia Corp. couldn't find an offer-worthy candidate for his Kingston, Ontario-based Web marketing firm.

When a client requested a custom-built Shockwave game, Paul looked to ITsquare.com Inc. "We're really busy these days," Paul says. "So whenever an opportunity comes up to outsource, we take it because it allows us to concentrate on what our jobs are."

ITsquare runs a Web-based matchmaking service that puts corporate requests in the hands of development firms. IT-square posts projects on its secure intranet site, called the Information Technology Expert (ITE) Network, where they receive bids from more than 1,000 partner systems integrators.

Quick, Easy

Assisted by ITsquare, Paul developed a proposal for the Shockwave game. He received five or six bids back and selected Yashtec Solutions in Bombay, India. The proposal-writing and bid-evaluation process took less than two weeks.

"Normally, we would have to contact several firms to get estimates, whereas with ITsquare, we just go to one place," Paul says. He communicates with Yashtec through e-mail and ITE.

"I am less concerned about the geography because we're going through a company like ITsquare, and they guarantee that we don't pay unless we get what we wanted," he says. "Eventually, we will hire someone, but talented people are difficult to find, especially in a small town of 100,000."

Widening the bid pool for buyers and sellers of development work offers value, says John Mann, an analyst at Patricia Seybold Group in Boston. "Being able to bring together two parties that are at opposite ends of the world over the Web is a lot cheaper than getting on an airplane," he adds. "If I am a small company, I have two choices: ask my buddies if they know someone, or if I have no local resources, I have to look for other markets."

ITsquare hopes to bridge the geographical gap between development companies and information technology shops that want to outsource. IT-square's ITE includes more than 1,000 developer firms. Approximately 85% of the firms are based in the U.S. and Canada. The rest are in India, the Philippines and Ireland.

"We're enabling software firms in different parts of world to work together," says Harvi Sachar, CEO of ITsquare. "If you want software development done, and if you have a $1 million budget, [systems integrators] will talk to you. But if you don't, they won't even return your phone calls."

JOHN RAE

IF YOU HAVE a million dollars to spend, developers and integrators will talk to you, says Harvi Sachar, CEO of ITsquare

ITsquare.com Inc.

Location: 1090 King Georges Post Road, Suite 401
Edison, N.J. 08837

Telephone: (732) 738-5509

Web: *www.itsquare.com*

Niche: Matching up a corporate IT department's application development projects with contractors and systems integrators

Why it's worth watching:
ITsquare is poised to lead the market if its service catches on.

Company officers:
- Harvi Sachar, co-founder and CEO
- S. R. Easwar, co-founder and chief technical officer

Milestones:
- January 1999: Development of Web site
- July: Company launch
- August: First customer signed
- October: First-round funding

Employees: Nine

Burn money:
K. B. Chandrasekhar, chairman and co-founder of hot Internet service provider Exodus Communications Inc.

Customers: ITsquare has made about 30 matches, including inonMedia Corp. and Vdaya LLC.

Partners: More than 1,000 prequalified consulting firms signed

Red flags for IT:
- Although ITsquare guarantees its developers' work, a project that fails to meet expectations can set customers back weeks or months.
- Working out an appropriate project proposal takes time, which may be wasted if no firms accept the bid.

COMPUTERWORLD emerging companies

Customer Protection

Sachar wants to leverage development talent abroad and make it feasible to work with these organizations.

ITsquare offers its customers a guarantee that the work they receive will meet expectations or they aren't obligated to pay. The company hopes to field requests in the $50,000-to-$200,000 range. Sachar also wants to field contracts to develop component parts of large-scale software development jobs.

"There are many routine projects that don't require a lot of business knowledge to complete," Sachar says. ITsquare doesn't hire freelancers because it wants to ensure accountability and work only with integrators with a proven track record, Sachar says.

"It's a valid concept," says analyst Bob Larrivee at Kinetic Information Inc. in Waltham, Mass. "A lot of smaller projects may take a back burner because there's no time or money to do it, and the user group who requested it gets frustrated. If IT goes with outsourcing, they maintain lower overhead costs because they're hiring by the project."

Chip Yates, a partner at Vdaya LLC, is using ITsquare to outsource a six-figure project to develop a multimedia application. Yates says development skills are tough to find in Newington, Conn. "This type of intermediary always existed, but the trick was finding them, particularly outside of a major metropolitan market," says Yates. Vdaya received seven prequalified bidders from ITsquare.

Although outsourcing development on a key project poses a risk, Yates says ITsquare mitigates some concern. "Everything in this industry is a risky approach," he says. But there would be risk "whether we brought someone in-house or outsourced, because you can just as easily hire a flake as outsource to a company that doesn't deliver." ◗

[the buzz]
STATE OF THE MARKET

Foreign Spending

ITsquare isn't alone in wanting to tap into lower-cost foreign markets to serve U.S.-based application development outsourcing needs. Northeastern Universal Software Inc. and Auriga Inc. both say they hope to leverage their networks in China and Russia, respectively, when marketing services in the U.S.

Northeastern Universal Software

With operations in Shenyang, China, and Santa Clara, Calif., Northeastern Universal Software (Neusoft) develops more than 40 software products and provides systems integration services and medical equipment development.

Neusoft CEO Ping He wants to grow the firm's contract software development business outside China. He says one of the advantages Neusoft offers is the relatively lower development costs for Chinese vs. U.S.-based developers.

"We have first-class engineers in China," He says. "Indian companies are doing a lot of projects here, and Chinese firms are doing some but not very much."

Auriga

Based in Amherst, N.H., Auriga offers contract custom software development and staffing to its customers. The company's software development center in Moscow employs about 60 Russian developers, who tend to develop projects for customers based abroad. Aleksei Sukharev, founder and president of Auriga, says most of his engineers work in Russia, but most of the company's customers are based in the U.S.

Auriga's U.S. customers include The Santa Cruise Operation Inc., Lynx Real Time Systems Inc. and Interleaf Inc. Sukharev says the salaries of Russian developers can be a third to half those of American developers.

Offering to service software development proposals across international boundaries shows a lot of promise. To make it work, companies that outsource their development projects abroad also need help to explicitly define the functional scope of these projects and cut across cultural barriers, says John Mann, an analyst at Patricia Seybold Group.

"The fact that they help scope out a project clearly adds additional value," Mann says. Most companies would have no idea how to bridge the cultural and communication gaps between themselves and foreign parties, he adds. – *Lee Copeland*

choices

More than 200,000 professionals and 2,100 technology companies came together in Las Vegas to help shape the future of the Internet economy.

"Every CEO is now asking themselves, what is my Internet strategy, and why do I have to learn about all these things and redefine my business around them?"

Bill Gates

"Is the Net working for you? Is it living up to the hype, or has it let you down? These are some of the tough questions that are perfect for a COMDEX audience to answer."

Carly Fiorina

"Today the world is moving toward a broadband and networked environment. Digital content is what will drive people to the network, and new digital hardware will enable consumers to manipulate it for their personal enjoyment."

Nobuyuki Idei

"Open Source generates better programs. Why does it do that? Because of competition."

Linus Torvalds

"The Internet and education must go hand in hand. We have the power in our hands now to make the first industrial revolution look small."

John Chambers

"The client/server model that we have operated on for 15 years...shifts to one that is much, much more network-centric. That is the key message in the show, and that is the key message in the industry as a whole."

Eric Schmidt

"It's not just workstations or servers that are getting hooked to the Internet, but everything with a digital or electronic heartbeat."

Scott McNealy

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October 24–26, 2000
Montreal, Quebec

COMDEX/Fall 2000
November 13–17, 2000
Las Vegas, Nevada

Job Trek: Next Generation of Relocation Tools

BY CHRISTOPHER LINDQUIST

THE COMPANY just offered you a chance to take over a new division. It's a great opportunity — the kind of thing you've been working for your entire career. There's just one problem: The division is a thousand miles away, and you need to start in three weeks.

If you're lucky, your firm may have a relocation specialist on call, ready to handle all the details of moving you and your family on a moment's notice.

But if that's not the case, the Web can help. A new generation of Internet-based relocation tools and services can help you do everything from selling your current home to buying a new one to finding the best schools for your kids in that faraway place.

These online services range from cost-no-object extravagances that can set you up with everything from luxurious temporary housing and transportation while they find your dream home to more "virtual" sites that don't offer the services themselves but instead help you find movers, apartments, rental cars and other basic information about your new hometown.

Up-to-the-Minute Updates

Two features make these online services stand out from simply dealing one-on-one with a relocation expert or using relocation software packages: The information is always available, 24 hours per day, and it can be updated regularly.

That timeliness and freshness can be critical. Some 50% of people asked to move have only two weeks in which to make the decision, with another 25% getting just one month, says Beverly Roman, publisher at relocation book specialist BR Anchor Publishing in Wilmington, N.C. That's not much time to determine if the move makes sense financially, professionally and personally.

Juggling Act

"It's 74% dual careers in this country, and more than 60% of the people moving have children," Roman says. "This is what people are faced with; these people have to juggle the possibility of a relocation with all these personal challenges." As a result, she says, "not every move is a good opportunity."

The job of a relocation service, she says, should be to provide you with practical information to make informed decisions. A good relocation service can help answer the following questions and more:

- Can your spouse find work in the new location?
- How good are the schools?
- What kind of medical care is available?
- Is elder care nearby in case you need to help support a parent?

We found a number of Web sites that specialize in helping people move with as few headaches as possible.

Lindquist is a freelance writer and reviewer in Moss Beach, Calif.

HomeFair.com

www.homefair.com

This online service won't find a home for you or enroll the kids in a new school, but it can give you a head start on doing all that yourself – for free.

The site includes a number of automated calculators and wizards that can help you check cost-of-living information, determine how much it will cost you to move and decide how much of a mortgage payment you can afford.

A relocation wizard will even create an extensive, printable time line of things to do based on your move information.

Other links on the site can take you to city and school information, apartment listings, self-storage companies – even a free service that can transfer or set up all of your utility accounts.

Not every service on the site is free (credit reports cost from $10 to $30, for instance), and some of the links are of only tenuous value for movers (do you really need a new vacuum for your new house?). But overall, HomeFair.com offers a lot of features in one convenient location for little or no money.

VirtualRelocation.com

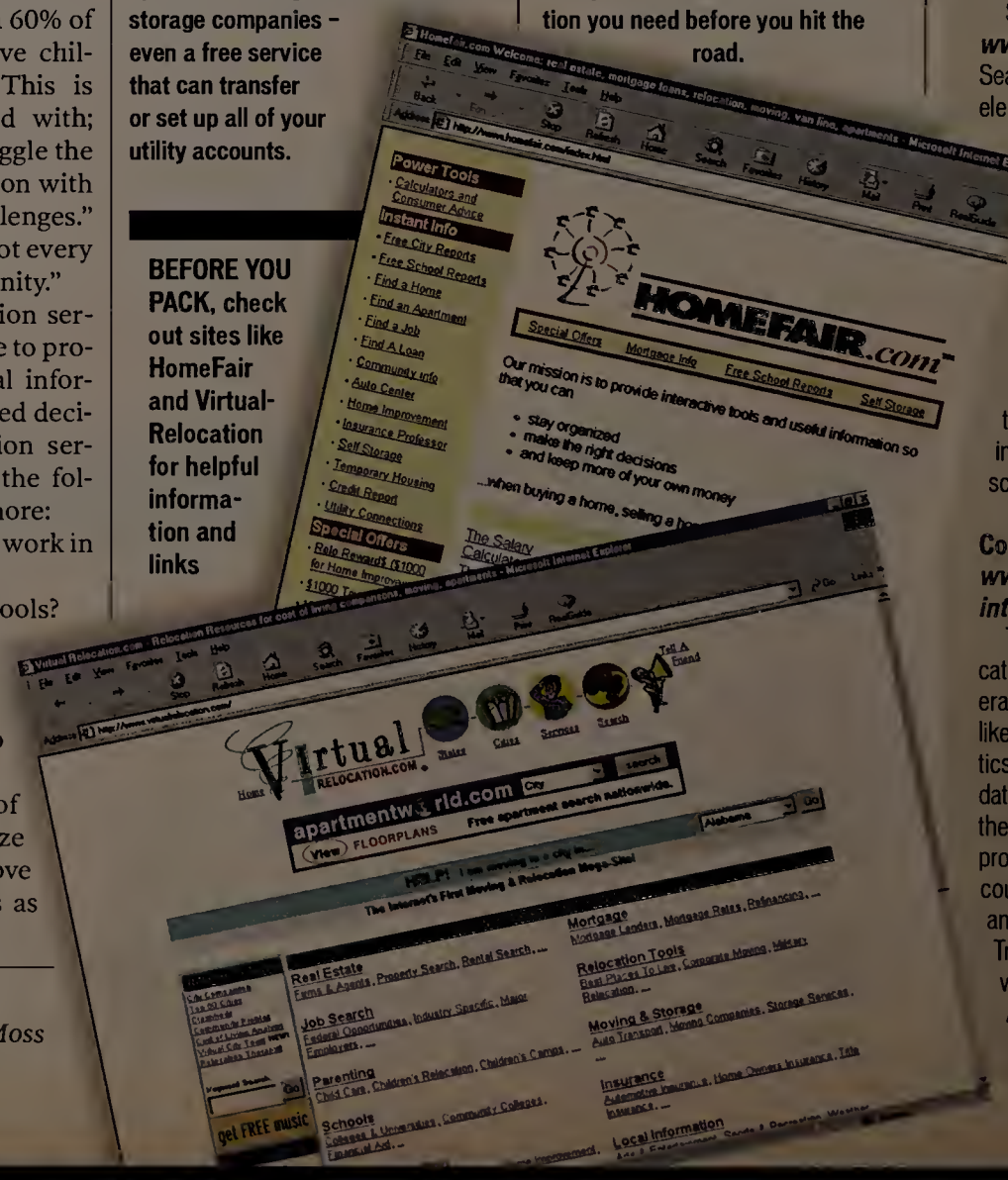
www.virtualrelocation.com

A no-cost, sponsored site, VirtualRelocation.com resembles a Yahoo-like portal aimed specifically at people on the move. The site lists thousands of links to information in 14 categories such as real estate, relocation tools, local information and more and well over 100 subcategories, including child care, rental search, community colleges and health care.

You can also jump directly to local sites based in hundreds of cities in all 50 states. Alternatively, do a community profile search and get statistics such as average age of residents, local industry information, transportation services and more – for free. You can even take a virtual tour of a dozen major U.S. cities via photographs of landmarks.

Like HomeFair.com, VirtualRelocation.com won't provide you with anything more than information. But it's a well-organized place to start your search for the information you need before you hit the road.

BEFORE YOU PACK, check out sites like HomeFair and VirtualRelocation for helpful information and links



Other Online Assistants

In addition to complete online relocation services, there are a number of sites that can help you find what you need to make your move, from school rankings to where to eat once you get there.

CitySearch
www.citysearch.com

From restaurants to sporting events to cultural activities, CitySearch can help you find what you like. With listings for more than 40 U.S. metropolitan areas, plus a few international locations, you're likely to find a CitySearch site for your new home. Search online for real estate agents, hotel rooms and car rental agencies before you go for a visit.

***Money Magazine*'s Best Places to Live**
www.pathfinder.com/money/depts/real_estate/bestplaces/

The long-famed Best Places list goes online. Find out where your proposed destination falls on the list, then check out demographic data, weather information and more. You can also compare the cost-of-living indices of where you are now with where you might go to see if that raise will be enough.

SchoolMatch
www.schoolmatch.com

Search through thousands of elementary and high schools nationwide to get free information, such as the number of students and teachers, and contact information. Then order an inexpensive ($34) report that describes the school system in detail, from class size to expenditures per pupil to per-capita income of local residents to scholastic performance.

Employee Relocation Council Resource Center
www.erc.org/research/intlinks.htm

This site is intended for relocation pros, but it includes several worthwhile links to sites like the Bureau of Labor Statistics (where you can dig up job data from around the country), the CIA World Fact Book (which provides information about countries around the world) and U.S. State Department Travel Warnings (find out which countries don't want Americans hanging around).

– Christopher Lindquist

Java Database Connectivity

BY CAROL SLIWA

THE JAVA programming language has become a mainstay for building corporate Internet applications since Sun Microsystems Inc. launched the technology almost four years ago. But a crucial element to making Java useful was having a standard way to let Java application developers access databases. That common database interface, rolled out shortly after Java itself, is Java Database Connectivity (JDBC).

By using the JDBC programming interface, Java programmers can request a connection with a database, then send query statements using SQL and receive the results for processing.

JDBC handles the actual connection, sending queries and data to and from the database. According to Sun, specialized JDBC drivers are available for all major databases — including relational databases from Oracle Corp., IBM, Microsoft Corp., Informix Corp. and Sybase Inc. — as well as for any data source that uses Microsoft's Open Database Connectivity system.

Homegrown Queries

But programmers using JDBC typically create their own SQL queries, which requires more work than using visual-oriented tools for building the queries.

"You have to write the SQL statements manually, and you have to make sure they're well formed," said Daryl Plummer, an analyst at Stamford, Conn.-based Gartner Group Inc. "If you leave out a quotation mark or write something that doesn't make sense, the system is going to send it to the database as if it makes sense, and you will get an error back."

JDBC also allows programmers to update multiple data items with a single command, or even access multiple database servers within a single transaction. In addition, it lets programmers reuse database connections — a process known as connection pooling — so a new connection doesn't need to be made to a database for each new JDBC command.

Because Java runs on many different hardware platforms and operating systems, developers can use JDBC to write applications that access data across incompatible database management systems running on varied platforms.

Even Java developers who have had trouble getting an application to run on multiple platforms typically say it's easier to tinker with the program to get it running cross-platform than to do a complete rewrite of their work.

Using JDBC has become simpler for companies that opt to use an application server, which is software that sits between the client and the database server accepting and directing the data requests. Application servers have JDBC support built into them, reducing the amount of code the programmer needs to write.

"I can't even imagine how much more productive I am with an application server rather than JDBC — maybe in the range of 400%," said Chad Ruff, president of Sage Software Inc. in Atlanta, who has been writing Java applications for three years.

Plummer predicts that by the end of 2001, when using an application server will be the dominant means of building new applications, "people will become much less concerned about JDBC drivers because they'll have picked the application server because of its support for a certain database."

Helpful in Three Ways

But for now, JDBC can be helpful in at least the following three common business scenarios, according to Sun product manager Milena Volkova:

- When there's a need to disseminate information internally in a large company where departments have standardized on different platforms.
- If a corporation has undergone a merger and finds itself with different operating systems and databases.
- For e-commerce applications that run over the Internet, where the company has no control over the software its customers use. The customers only need the appropriate Java technology, which can be downloaded on the fly to their computers.

DEFINITION

Java Database Connectivity is a programming interface that lets developers using the Java programming language gain access to a wide range of databases and other data sources, either directly or through middleware.

JDBC Drivers

To connect with individual databases, JDBC requires drivers for each database. Those drivers come in four varieties. Types 1 and 2 are intended for programmers writing applications, while Types 3 and 4 are typically used by vendors of middleware or databases. The following are more detailed descriptions of those drivers:

Type 1: JDBC-ODBC bridge.
Provides JDBC access via one or more Open Database Connectivity (ODBC) drivers. ODBC, which predates JDBC, is widely used by developers to connect to databases in a non-Java environment.
Pros: A good approach for learning JDBC. May be useful for companies that already have ODBC drivers installed on each client machine – typically the case for Windows-based machines running productivity applications. May be the only way to gain access to some low-end desktop databases.
Cons: Not for large-scale applications. Performance suffers because there's some overhead associated with the translation work to go from JDBC to ODBC. Doesn't support all the features of Java. User is limited by the functionality of the underlying ODBC driver.

Type 2: Partial Java driver.
Converts the calls that a developer writes to the JDBC application programming interface into calls that connect to the client machine's application programming interface for a specific database, such as IBM, Informix, Oracle or Sybase.
Pros: Performance is better than that of Type 1, in part because the Type 2 driver contains compiled code that's optimized for the back-end database server's operating system.
Cons: User needs to make sure the JDBC driver of the database vendor is loaded onto each client machine. Must have compiled code for every operating system that the application will run on. Best use is for controlled environments, such as an intranet.

Type 3: Pure Java driver for database middleware, which provides connectivity to many different databases.
Translates JDBC calls into the middleware vendor's protocol, which is then converted to a database-specific protocol by the middleware server software.
Pros: Better performance than Types 1 and 2. Can be used when a company has multiple databases and wants to use a single JDBC driver to connect to all of them. Server-based, so no need for JDBC driver code on client machine. For performance reasons, the back-end server component is optimized for the operating system that the database is running on.
Cons: Needs some database-specific code on the middleware server. If the middleware must run on different platforms, a Type 4 driver might be more effective.

Type 4: Direct-to-database pure Java driver.
Converts JDBC calls into packets that are sent over the network in the proprietary format used by the specific database. Allows a direct call from the client machine to the database.
Pros: Better performance than Types 1 and 2. No need to install special software on client or server. Can be downloaded dynamically.
Cons: Not optimized for server operating system, so the driver can't take advantage of operating system features. (The driver is optimized for the database and can take advantage of the database vendor's functionality.) User needs a different driver for each different database. – *Carol Sliwa*

RESOURCESONLINE

Here are some helpful links to information about JDBC on the Web:

http://java.sun.com/products/jdbc/datasheet.html
Contains a diagram illustrating how JDBC works.

http://java.sun.com/products/jdbc/faq.html
Offers answers to frequently asked questions about JDBC.

http://java.sun.com/products/jdbc/features.html
A list of JDBC's features.

Are there technologies or issues you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.

Big Dreams For Tiny Money

New generation of start-ups tackles Web micropayment problem By David Essex

CLEVER NEW PACKAGES for handling small transactions on the Internet are rising phoenixlike from the ashes of mid-'90s failures. What's allowing this rebirth, according to vendors and market analysts, is unexpectedly rapid acceptance of Web purchasing, a greater understanding of the convenience and security demanded by consumers and merchants, and the sheer size of the e-commerce opportunity.

First-generation "micropayment" schemes are either dead or struggling. First Virtual Holdings Inc. in San Diego got out of the business last July, citing insufficient volume, and encouraged its customers to sign up with Reston, Va.-based rival CyberCash Inc. Five months later, pioneer DigiCash Inc. filed for Chapter 11 bankruptcy protection. CyberCash dropped its CyberCoin micropayment effort in February 1999 to focus on other Internet payment and point-of-sale systems.

Not all early players are gone. Millicent, a Digital Equipment Corp. technology acquired by Compaq Computer Corp., sells access to the article archives of *Asahi Shimbun*, one of Japan's largest newspapers. MasterCard International Inc.'s Mondex effort has European and American pilots in various stages of completion.

Vendors most often blame failures on consumer reluctance to adopt new payment methods and the resulting unprofitably low dollar volumes. Another negative: Most early schemes required prefunding of electronic wallets or purses. "Some wallets store all the information on another site," notes Andrew Bartels, a senior research analyst at Giga Information Group Inc. in Cambridge, Mass. "A customer who's doing that is essentially handing their wallet to someone else."

Micropayment's quick trip from failure to rebirth is "a reflection of the size and the critical mass of the Internet," says Russ Jones, Millicent's business manager.

> E-commerce has grown faster than anyone expected, and the micropayment opportunity has grown along with it.
>
> **RUSS JONES, BUSINESS MANAGER, COMPAQ COMPUTER CORP.**

"When the market started to form three years ago, it was only about 100 times smaller than it is today," he says. "Since then, e-commerce has grown faster than anyone expected, and the micropayment opportunity has grown along with it."

"In the real economy, 12% of the gross dollar value is [in transactions] under $20," says Brian Smiga, senior vice president of marketing at 1ClickCharge in New York. Citing market-size predictions for 2003, Smiga adds, "If the 12% ratio applies, four years from now, it'll be a $12 billion market opportunity."

Micropayments have always been about selling Web-based content, and in the "early" days, the content tended to be articles and research reports.

But micropayment vendors predict that new types of content will fuel future demand for their products. Much of the activity is at music download sites such as Liquid Audio and MP3.com, where visitors can download songs for around a dollar each. MP3.com, for example, runs an offer with Seattle-based payment vendor eCharge Corp. that gives customers $25 to spend if they open an eCharge account. Online games are expected to soon be sold on a per-play basis, and the current growth in application service providers, along with plans by mainstream vendors like Microsoft Corp. and Corel Corp. to "rent" software, are expected to create an even greater need for micropayment mechanisms.

Smart cards contain microprocessors that can store personal information and cash balances, creating a secure and reasonably private electronic "purse" for small amounts. Microsoft last month released the Smart Card Toolkit, which uses Windows programming tools for smart-card development. American Express Co. recently introduced the Blue card, a smart card customers can use for micropayment purchases both online and off-line. Next year Amex will fund an online wallet.

Smart cards don't work as well for large e-commerce purchases, however; they require that a dedicated piece of hardware — a reader — be attached to each user's PC.

Consumers can register with sites like 1ClickCharge and Seattle-based Qpass Inc. to either draw from a wallet funded with advances from their regular credit card as they visit partner sites, or have their small purchases aggregated into amounts large enough for the card issuer to process without losing money.

ECharge takes a different approach, putting consumers through an online credit application before issuing a digital certificate good at eCharge merchant partners. The bill arrives via e-mail. "Really, what Echarge is is a smart card in your computer," says company co-founder and Vice Chairman George Fleming.

San Francisco-based iPIN and Saratoga, Calif.-based Trivnet Inc. also aggregate micropayments onto your Internet service provider or phone bill. Trivnet CEO Moti Dolgin says this approach frees consumers from identifying themselves each time they visit a Trivnet-compatible merchant, but the credit-card camp says people who don't have personal accounts with service providers — notably employees behind corporate firewalls and college students — can't use such systems. Dolgin offers credit-card billing as an alternative.

Incompatible Mechanisms

Web merchants pay a pretty penny to drink from the micropayment stream. Payment vendors typically take 5% to 30% per transaction.

However encouraging the new schemes may sound, the micropayment industry has a frontier feel that will likely result in a plethora of incompatible payment mechanisms.

"It's at the land-grab stage right now," admits Paul Bandrowski, president of Buffalo-based Reciprocal Inc., another young company. Reciprocal focuses on digital rights management, the infrastructure for ensuring that music artists and other content creators get their percentage of each micropayment. Though international standards bodies are addressing digital purses and other payment mechanisms, there are no serious efforts to standardize the newer solutions from Ipin, Qpass and companies with similar services.

1ClickCharge's Smiga insists that the winner will be whoever buddies up with a major credit card and signs up the most big-name Web merchants — while hinting that his company may soon do both. Fleming, meanwhile, says the name of the game is driving down transaction costs for the vendor while delivering the most customers.

Essex is a freelance writer in Antrim, N.H.

MOREONLINE

For a list of related Computerworld articles and other resources dealing with micropayment technologies, visit our Web site.
www.computerworld.com/more

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Supercom from R&D to P&L

High-performance computers aren't just for trivial work like modeling the universe. Nowadays, they're doing important things like analyzing mortgage risk

By Mark Hall

THE LAST PLACE YOU'D EXPECT to see a Cray supercomputer is 30 miles south of the Arctic Circle. But supercomputers are showing up in a lot of unexpected places these days: analyzing loan risks, sifting through credit-card transactions for possible fraud or crunching through data on hard drive failures.

Scientists at the Arctic Region Supercomputing Center (ARSC) outside Fairbanks, Alaska, spend most of their time modeling global climate changes. But when a local schoolteacher wanted to give his pupils an up close view of the migratory habits of indigenous wolves, the ARSC lent some of its Cray computing cycles to gather telemetry data from a collar attached to the alpha, or lead, male. It then visualized the data to give the pupils a better idea about the vast distances wolves travel during a year.

High-performance computing (HPC) is no longer strictly for scientists. In fact, today most people believe that supercomputing development is being driven more by corporate profit and loss (P&L) realities than highbrow theory. That's because key technologies developed for HPC systems, particularly data mining and data visualization, bring a competitive advantage to companies.

Last year, according to Smaby Group Inc., a Minneapolis research firm, $3.1 billion was spent on supercomputers running scientific and technology applications, with commercial applications accounting for $6.6 billion. By 2002, CEO Gary Smaby predicts, the scientific and technical portion will drop to about one fourth of the total market.

At BlackRock Inc., a financial management firm in New York, the company uses data mining to analyze 55 million outstanding mortgages in the U.S. Afshin Goodarzi, a vice president at BlackRock, has about 170G bytes of mortgage information in a Sybase database on an Origin 2000 system from Silicon Graphics Inc. in Mountain View, Calif.

Follow the Money

Using data mining, he has devised prepayment models for every individual mortgage in the country, making it easier to predict when an individual borrower will pay off his loan — thus ending interest payments to the lender.

"The old way was to analyze 'pools' of data. We look at the individual loan level to discover payment characteristics," Goodarzi says. Before the advent of HPC systems and data mining, he says, "the size of the data had always been prohibitive. The technology now lets people think about the individual."

One of the largest disk-drive manufacturers in the world, Western Digital Inc. in Irvine, Calif., cranks out 100,000 drives per day. For each drive, the company records 1,000 discrete pieces of information. The data is stored for three to five years, depending on the drive's warranty.

In the past, according to Ken Chatfield, a vice president at SageTree Inc., a wholly owned subsidiary of Western Digital, the company would look at historical trends of disk-drive returns to predict failure rates. That information would be used to build the extra drives based on the sales forecast to cover the "failed" drives returned to the company.

More Variables

"Now we can ask more intelligent questions of the data," Chatfield says, such as where the products are shipped to determine whether higher or lower humidity affect failure rates. "We can look at atomic-level detail and quickly visualize where failed drives came from, which production line built them, who tested them and anything else we can think of."

A side benefit from using data mining to reduce the number of returned disk drives, Chatfield says, "has been measuring call center operator accuracy of every product returned to Western Digital." The company discovered that the so-called "dead" drives that had been returned frequently worked just fine. But it was too late, because by then a replacement had been shipped to the customer.

The problem turned out to be helpdesk personnel incorrectly assessing the problem, adding unnecessary expense to Western Digital and, worse, not fixing the user's system.

By using data mining, Western Digital can determine which call center operators need more training. It also has helped design bonus programs for help desk staffers who achieve high accuracy rates over the typical quantity of calls.

Top Five HPC Vendors

By revenue and market share

HP	$1.1 billion	22.1%
SGI	$952 million	19.1%
Compaq	$942 million	18.9%
IBM	$909 million	18.2%
Sun	$598 million	12%
Other	$435 million	8.7%

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

mputing:

Robert Grossman, a professor at the University of Illinois in Chicago, is a widely recognized expert in data mining. He has seen its commercial application done right numerous times. For example, in detecting credit-card fraud, data mining can be a profoundly useful tool. Such technology has been greatly beneficial to companies such as Visa International Inc. and American Express Co.

Lagging in Use

But in e-commerce, where far more data is gathered during each credit-card transaction, data mining has been slow to catch on.

Fraud detection has also been used in Texas, which in 1996 estimated that it had more than $7.8 billion in fraudulent Medicaid billings from doctors and test labs. Now that cost is down to $800 million. Part of what's making this possible is that the data visualization tools used to mine the vast troves of stored data are becoming abundant.

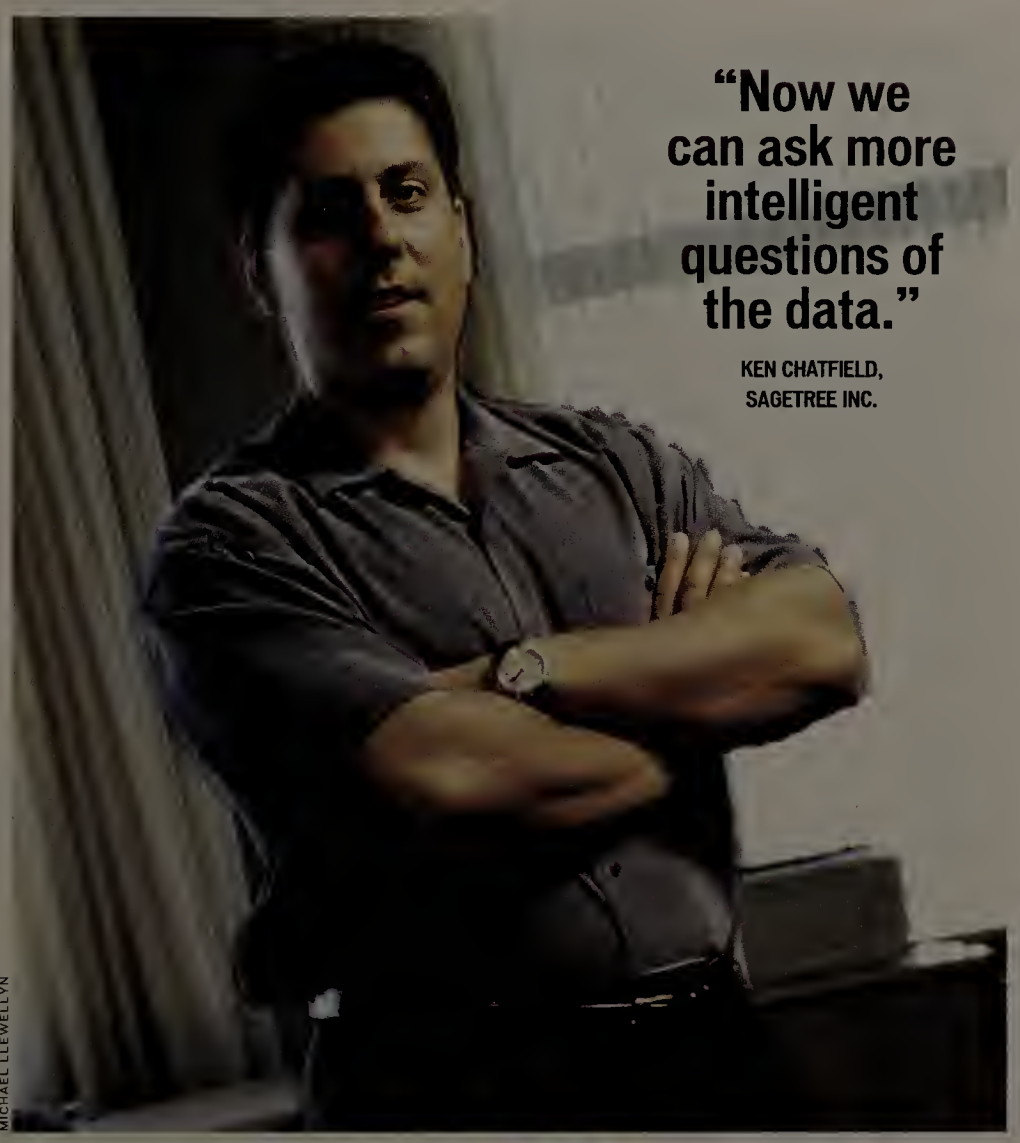
At last month's SC99 conference in Portland, Ore., scads of visualization tools were on display from Advanced Visualization Systems Inc., Logicon Inc., Numerical Algorithms Group Inc., Pallas Inc., SGI and others.

Grossman, who says data mining faces many challenges, thinks the ease-of-use problem is one of its thorniest. His worry is too much ease of use, not too little.

"Statisticians don't want to [make it easier] because it gets rid of the priesthood of statistics," he says. "But you also run the risk of getting stupid people doing stupid things with data, such as correlating heart attacks with the positions of the stars."

Super Web Servers

E-commerce does depend on supercomputers for sheer horsepower. Brokerage Charles Schwab & Co. in San Francisco uses 2,000 IBM RS/6000 SP systems but only to run its Netscape server software because these Unix-based systems are ideally suited to handle millions of relatively simply HTTP requests. All the stock trades, though, continue to happen on the company's back-end S/390 mainframes.



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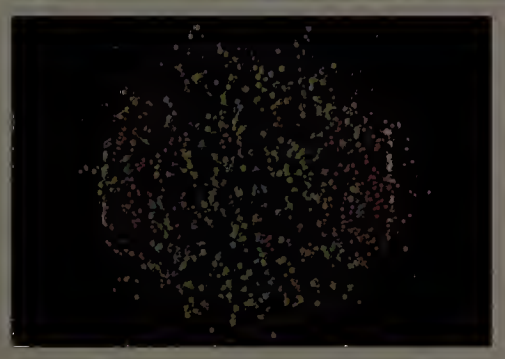


A FRAME from the simulation of a collision of two gold nuclei in the Relativistic Heavy Ion Collider at Brookhaven National Laboratory in Upton, N.Y.

A CRAY supercomputer at the Arctic Region Supercomputing Center in Alaska provides a visual display of the vast distances wolves travel in a year

With few exceptions, high-performance computing hasn't found a use on the transaction side of e-commerce. One reason is that HPC applications require specialized programming tools and skills to take advantage of the parallel processing capabilities of supercomputers. Companies like Etnus Inc., The Portland Group Inc., Sundance DSP Inc. and others offer such products, but they are targeted at the scientific market.

Commercial customers who do use HPC tend to be in relative niche markets such as the petroleum and automotive industries. Mainstream IT application developers are generally not good candidates for high performance computing — yet.

Sun Microsystems Inc. hopes to change that through its Java programming language with optional parallel capabilities. Given Java's widespread use among IT shops, this has some potential. But it's in its nascent stages.

Data Flood

Two things will make data mining and data visualization, the two HPC applications well-suited for IT, commonplace in electronic business. The first is the vast amount of click-stream data saved on each visit to a Web site. The second is the plummeting cost of storage. According to Richard Winter, president of market researcher Winter Corp. in Waltham, Mass., it's dropping as fast as 50% per year per terabyte.

"A terabyte might cost a company a few hundred thousand dollars. But the information it holds adds tens of millions in profits to a company," he says.

For example, Winter says, data mining helped companies learn that if they placed greeting cards in drugstores next to the lipstick counters, card sales skyrocketed.

"You don't know why it's true. You just know it's true," Winter says.

Unlike Grossman, who has concerns about HPC technology getting too easy to use, Winter sees data mining's increasing simplicity as its strongest virtue. "Data mining is the first database technique where you don't have to have specially trained analysts thinking up your questions for you," he says.

After all, what statistician would have connected lipstick and greeting cards?

IT Commercialized

1998

BY LESLIE GOFF

A FUNNY THING happened on the way to the computer room in 1998. Information technology professionals became front-page news.

Somewhere between the dot-comming of the world and public awareness of "that Y2K thing," IT professionals acquired a new cachet in the public eye. The dearth of skilled programmers was sounded by major news organizations, testimony from the Microsoft Corp. antitrust suit was the lead story on the nightly news and the hoopla as Generation Xers became overnight millionaires from Internet start-up initial public offerings threw a glamorous spotlight on an oft-ridiculed profession.

Slow Change

It didn't happen overnight, of course. In a nutshell, first there was the office PC, then the home PC and then the Web. By the end of 1998, 55.8 million people age 16 and over had Internet access in their homes, according to Redwood City, Calif.-based research firm Zona Research Inc. And everyone from grandmothers to schoolchildren began speculating about the end of the world come New Year's Eve 1999.

Some 52 years after the unveiling of the Electronic Numeric Integrator and Calculator (ENIAC), IT — and the people who made it all work — were finally seen, on a wide scale, as where the action was.

The once-lowly IT professional even started to be depicted in the mass media with a degree of reality. Gone were the pocket protectors and the heavy-rimmed, Scotch-taped eyeglasses. These mass-media IT professionals stepped straight out of the J. Crew catalog: smart, hip and affluent.

"It's totally tied to the PC revolution," says Steve Hayden, president of worldwide brand services at ad agency Ogilvy & Mather Worldwide in New York. Hayden was copywriter on the now-famous Macintosh commercial that aired during the 1984 Super Bowl and is now creative director of IBM's electronic-business campaign. "Computers were always objects of mystery and power, threat and promise. But now, when the technology becomes personal, the entire infrastructure supporting that becomes part of the popular culture," he says.

Most notably, IT professionals started to show up in the reflecting pool of the collective consciousness: television advertising. In its award-winning electronic-business television ad campaign, IBM featured IT professionals front and center, on the job in real-life situations. In one commercial, a computer security analyst calls his CEO in Paris in the middle of the night to report that the system has been hacked.

A CLIP from a 1998 Techies.com commercial: An IT professional steps off the elevator to the cheers of coworkers and the glare of spotlights

Another IBM ad simultaneously mirrored the new love affair with technology and elevated the status of the IT professional. Just as two employees send a flaming e-mail to their boss because they don't have IBM laptops, the PC help desk guy shows up to install their new machines. He's the hero, while they may have just committed career suicide — over a laptop.

Techies.com Inc., an IT job-search site based in Edina, Mich., launched a TV spot in several local markets in 1998 that portrayed IT professionals as corporate celebrities getting the red-carpet treatment. As a jeans-clad database analyst steps out of the elevator in a busy corporate environment, all the employees stop what they're doing to applaud and cheer him. He then enters his massive office with skyline views, where he kicks back in his executive leather chair.

Although exaggerated and whimsical, the ad makes a valid point, notes Drew Ianni, a senior analyst at online market research firm Jupiter Communications Inc. in New York. Silicon Valley has long treated its talented IT executives like celebrities, but in 1998 "America woke up to the fact that IT people are cool and making a lot of money and turning into media stars," Ianni says. "You have bidding wars breaking out over top talent. They are stars, in the traditional sense."

That an Internet start-up found there was enough interest in IT jobs to merit local spot ads signals the shifting perceptions of IT professionals, says Tom Tracy, director of marketing and communications at Techies.com.

"We're changing the perception even among children," Tracy says. "My son, who's in the second grade, thinks technology is so cool and something he might want to develop. Even three years ago, kids probably thought of IT as geeky but now are totally embracing what tech people do."

Hayden likens the emergence of IT professionals in the mass media in 1998 to the emergence of race car drivers, gas station attendants, auto company executives and mechanics as characters in popular literature in the 1920s.

Before Henry Ford's Model T, automobiles were seen as rare items that only the very privileged could afford. With the introduction of the Model T, cars become a personal possession, and people who worked in the car business earned their place in the mass media, Hayden says.

Likewise, in 1998, IT professionals finally found their place in the mainstream of public consciousness. ◗

Goff is a frequent contributor to Computerworld. *Contact her at lgoff@ix.netcom.com.*

Technology Happenings

- PC maker **Compaq Computer Corp.** acquires minicomputer manufacturer **Digital Equipment Corp.** for $9.6 billion.
- Midway through the year, **Microsoft Corp.** debuts **Windows 98**.
- In November, service provider **America Online Inc.** buys browser developer **Netscape Communications Corp.** for $4.2 billion in stock.
- **Apple Computer Inc.** makes a stunning comeback. In January, the company posts its first profitable quarter in more than a year, with a profit of $47 million. Sales during the second half were largely driven by the new **iMac**.
- **Sun Microsystems Inc.** introduces its **Jini** technology, which enables plug-and-play network connectivity for a range of devices.
- The **U.S. Department of Commerce** enters into an agreement with the **Internet Corporation for Assigned Numbers** to establish a process for transitioning the management of domain names from government to industry.
- The release of the 450K-byte ***Starr Report*** on the investigation into President Clinton's relationship with Monica Lewinsky causes major Web traffic.
- The White House appoints **John Koskinen** its Y2K czar. Most government agencies get a failing grade in year 2000 readiness.
- The **Microsoft** antitrust trial begins in October in Washington.
- A federal judge orders **Microsoft** to rewrite parts of the Windows 98 operating system and other products to comply with **Sun**'s version of the **Java** programming language
- On May 20, an out-of-control **PanAmSat Corp.** satellite causes a massive service blackout, as tens of millions of pager customers lose service and TV network signals are disturbed.

Other Notables:

- The last episode of ***Seinfeld*** airs.
- Astronaut **John Glenn** returns to Earth after an encore space mission.
- The **Federal Drug Administration** approves **Viagra**, a drug to help men with impotence.
- **Best Picture:** *Shakespeare in Love*

Serbs battle ethnic Albanians in Kosovo.

Europeans agree on a single currency, the euro.

The House impeaches President Clinton along party lines on charges of perjury and obstruction of justice. Senate is divided on plans for trial or censure.

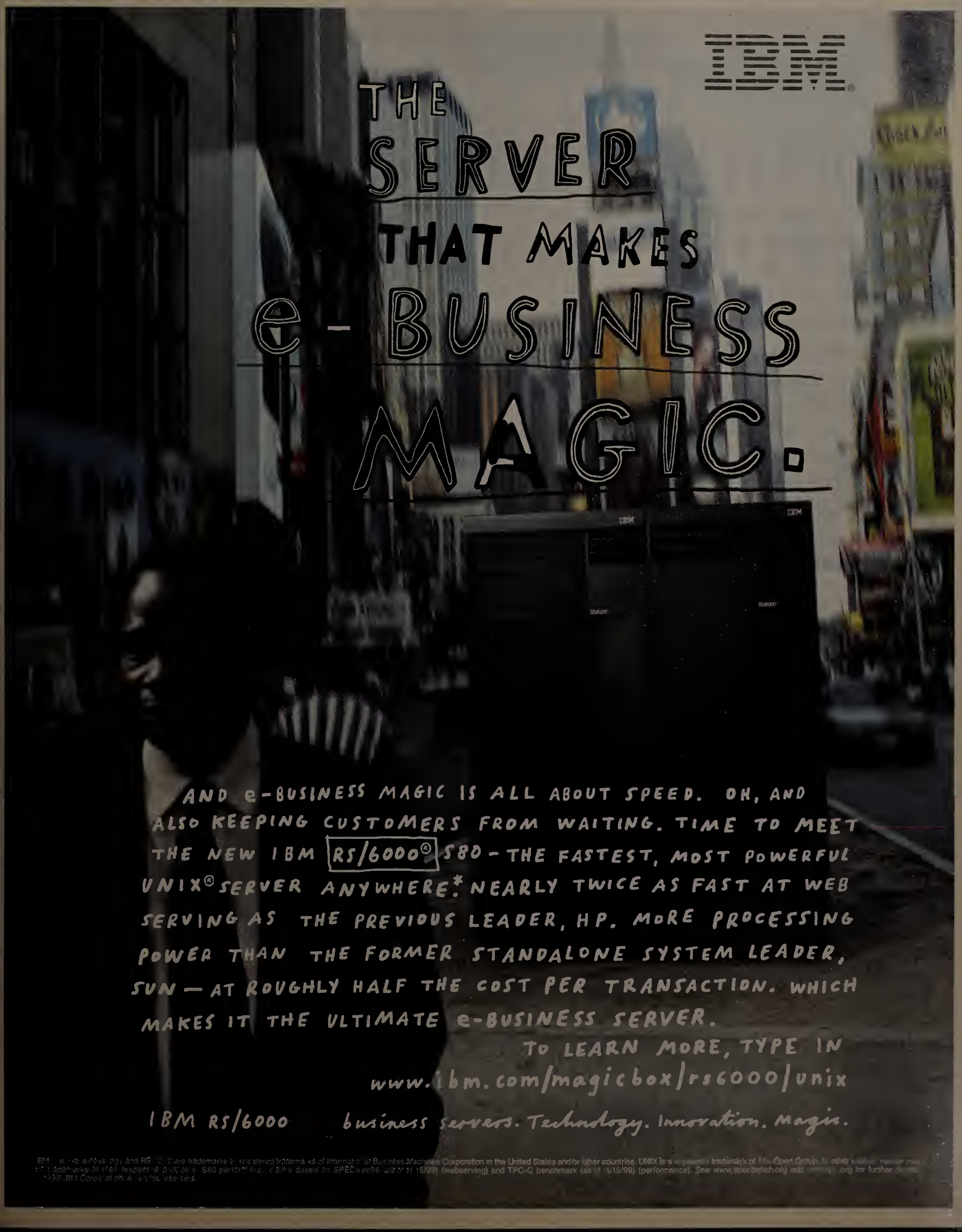
JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

President Clinton outlines the first balanced budget in 30 years. The U.S. Supreme Court rules the line-item veto unconstitutional.

Landmark peace settlement, The Good Friday Accord, is reached in Northern Ireland.

Clinton orders air strikes on Iraq.

■ Flashback is produced with the assistance of The Computer Museum History Center in Mountain View, Calif.



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Sorting Out Certifications

ROBERT NEUBECKER

Being certified in top technologies is still a key to getting higher pay in IT, but in most cases the cash benefits have declined to the level of a few thousand dollars per year

By Steve Alexander

THERE'S NO universal agreement on which certifications are the most desirable for obtaining career advancements or salary increases. But a list of five top certifications for career advancement was compiled from a survey of 470 independent information technology consultants placed in temporary jobs by RHI Consulting in Menlo Park, Calif.

Based on responses from 336 of the 470 contractors, the survey identified the top two certifications as Microsoft Certified Systems Engineer and Cisco Certified Internetwork Expert. Three other certifications that ranked about equally were Microsoft Certified Solution Developer, Certified Novell Engineer and Oracle Certified Professional. The survey also found that 83% of the contractors believed certifications either were "very important" or "somewhat important" to their prospects for career advancement.

But not all of the top five certifications on the list are equally useful for getting a salary increase. Tony Carr, a vice president of technical recruiting at Pencom Systems Inc. in New York, says the increased supply of people with Microsoft certifications has diminished the value of those certifications in the marketplace. Meanwhile, the relatively few people who have the Cisco certification are doing well in the marketplace, he says.

"There are tens of thousands of Microsoft Certified Systems Engineers out there but only about 5,000 Cisco Certified Internetwork Experts. As a result, you can get $20,000 to $30,000 more in salary if you're a newly certified Cisco person, for a total salary of $75,000 to $110,000," says Carr. "A Microsoft certification is probably worth a few thousand dollars" in additional salary.

But while certifications in general are becoming more common — and thus commanding less of a salary premium — there may be another reason to become certified, says Greg Scileppi, executive director of RHI.

"If Microsoft is saturating the marketplace with certified people, there may be a day when if you're not certified, you're not invited to the interview," Scileppi says. "It may become like a college degree: If everybody is graduating with a college degree in something, that sets the standard for that level of professionalism in business.

"I don't know how much money the IT certifications are worth in the marketplace," Scileppi adds. "But I believe they will translate into increased marketability if, and only if, the individual demonstrates he or she has ability. Being able to apply your expertise is where the rubber meets the road."

Carr attributes the scarcity of people with the Cisco Certified Internetwork Expert certification to the requirements for obtaining it, which include a rigorous hands-on lab.

"I'm told that most people don't pass the Cisco lab the first time, and that's part of the reason it's such a desirable certification to have. Anybody with a Cisco Certified Internetwork Expert certification knows what he or she is doing," Carr says.

While Cisco isn't the only company to require a hands-on lab for certification, it is unusual for a certification to involve more than classroom teaching, says Alan Salisbury, former president of Learning Tree International Inc. in Reston, Va., and now a director of the firm and an independent consultant. "Typically, certifications require knowledge-based tests, and that's where some of the criticism of certifications comes from," Salisbury says. "But to say that most certifications [that don't require labs] are just pieces of paper is a worst-case view and not totally accurate." ◗

Alexander is a freelance writer in Edina, Minn.

Comparison of Top Certifications

	ORACLE CERTIFIED PROFESSIONAL (DEVELOPER TRACK)	MICROSOFT CERTIFIED SYSTEMS ENGINEER	CISCO CERTIFIED INTERNETWORK EXPERT	CERTIFIED NOVELL ENGINEER	MICROSOFT CERTIFIED SOLUTION DEVELOPER
Cost	$7,485	$9,780 to $10,380	$9,780*	$8,800 to $9,200	$5,500 to $6,700
Classes required	None	None	None**	None	None
Time required	14 days	18 to 20 days	18 days	22 to 23 days	20 days
Jobs for which certification is an advantage but isn't required	Oracle developer, systems engineer	Windows NT network or NT systems administrator	Network support, network design consultant	Network planning, installation and configuration, managing network databases	Application developer, programmer, analyst, systems engineer
Jobs that require certification	Varies by company	Varies by company	Varies by company	Varies by company	Varies by company
Who usually pays for the cost of certification classes?	Employer	Employer	Employer	50% employee, 50% employer	Employer

*Doesn't include cost of practical lab exam. **Two years of industry experience recommended.

Regional Technical Lead-SAP ITS: Design, Develop & Coordinate SAP ITS based Internet solutions and lead ABAP/Web development team. Compose sales proposals for Internet strategy and participate in pre-sales process. Design layout screen and task flow for applicetion development based on customer needs. Install SAP ITS server & develop HTML templates, define ITS service, perform ITS edministration end develop Internet Application Components. Develop on-line transactions and reports using ABAP and extend them to the Web. Utilizing ABAP programming language in conjunction with SAP R/3 systems, develop conceptual program design specificetion and complete software modifications involving suitability of particular processes. Create reports, data dictionary objects, develop function modules and develop trensactions using Screen Painter end Menu Painter. F/T, M-F. MS in CIS or BS + 5 years exp. In SAP required. Send responses to: CW-13256, Computerworld, Box 9171, Framingham, MA 01701-9171.

SOFTWARE ENGINEER, TRADING SYSTEMS
Investment Management firm seeks a Softwere Engineer for trading systems to provide 24/7 herdware and software support for the computer system utilized by the company's commodity/currency trading desk. Duties elso Include developing software interfaces linking the trading desk with reseerch and accounting groups, writing and customizing software programs for the trading desk and supporting/meinteining existing trede programs. Mester's degree in Computer Sclence required. 1 yr exp in job/duties or 2 yrs. exp as Softwere Engineer designing/implementing performance monitoring systems & developing user interfaces. Salary according to experience. Send resume including current salary to RTC, 600 Route 25A, East Setauket, NY 11733, Attn: HFTZ

Software Engineer: Research, design, dev telecommunications software systems/subsystems including data integration, nextel/cell tech, paging, diary/e-mail services in conjunction w/ companion product hardware dev. Analyze designs/modifications/enhancements to determine feesibility, costs, dev time. Interact w/ herdwere engineers/other telecommunications engineers to interface herdware/software. Eveluate operationel/performance req of telecommunications softwere. Design, dev, direct testing procedures, programming, documentetion. Job is in Delray Beech, FL. Req: Masters in Comp Sci + 1 yrs exp or 1 yr es Progremmer/Anelyst. $57,000/yr, 40hrs, 8am-5pm. Submit resume to: Bureau of Workforce Program Support, P.O. Box 10869, Tallahessee, FL 32302-0869. ATTN: L. Knight. Re: JO# - FL 2022474.

PROGRAMMER/ANALYST to analyze, design, develop, test, implement and maintain epplication software for the banking industry uslng C and COBOL in both PC and Mainfreme pletforms under DOS, UNIX, Windows, Novell and Mainframe operating systems. Require: B.S. degree in Computer Information Systems, or a closely related field. Must have a demonstrated ability to perform the stated duties gained through previous work experience / academic coursework and projects. Salery: $46,000,000/year; 8 em to 5 pm M-F. Send resume to: Ron Stroup, VP Programming, The Intercept Group, 3150 Holcomb Bridge Road, Suite 200, Norcross, GA 30071-1370. Attn: Job PG.

SOFTWARE ENGINEER to provide on site consultancy to design and develop telecommunicetions diagnostic systems using client/server computing and object oriented C++ programming; analyze database systems end improve data access and management processes; develop internet applications using JAVA, PERL, JavaScript, ActiveX controls and GUI tools on Windows and UNIX with databases Sybase, MS Access end Oracle; UNIX network programming using TCP/IP and UDP, embedded SQL progremming. Require: M.S. in Computer Sclence/Electronics Engineering or closely related field. Coursework must include Java and C++ programming and Database Systems. 40% travel required to client sites within the United States. Salary: $59,000 per year, 8 am to 5pm, M-F. Mail resume to: President, Vision Soft International, Inc., 9141 Cypress Green Drive, Suite 2, Jacksonville, FL 32256.

Oracle Applications Consultant. Duties: Design, develop and implement software solutions for Oracle Financials and Oracle Manufacturing product suites. Design and develop custom Oracle interfaces using PL/SOL and develop reports and forms using Developer 2000 conforming to technical and functional design specifications. Assist in the preparation of project plans and schedules for the development of application systems. Requires: Master's degree in Comp. or Info. Sci., Eng., Bus. Admin. Or related field & 6 mths. Exp. in the job offered or 6 mths. Exp. as e Consultant or Software Eng. Graduate-level coursework must incl. Classes in Database Mgmt. & Operating Systems. Exp., which may have been obtained concurrently, must incl.: 6 mths. Exp. using Oracle and PL/SQL. EOE. 40 hrs./wk.; 8:00a.m. to 5:00 p.m. Salary: $65,000/yr. Send resume (no calls) to: Diane Tuccito, AnswerThink Consulting Group, 3200 Windy Hill Rd., Suite 800 West, Atlanta, GA 30339. Must have legal authority to work in U.S.

Software Consultant (multiple openings) to consult with client to define electronic data processing (EDP) need or problem; conduct study or survey on EDP problem to obtain & analyze data required for solution; advise clients on alternate methods of solving needs/problems or recommend specific solution; assist in implementation of solution; & use one or more of the following: Microsoft NT, Novell Netware &/or Windows NT. Reqs. Master's in Comp Sci., Systems Analysis, Comp. Info. Systems, Comp. Engg., Electrical or Electronic Engg., Electronics, Physics or Mathematics or its foreign educ equiv plus 1 yr exp in job offered or 1 yr related exp as Programmer, Progremmer Analyst, Systems Analyst, S/were Engr., Engineer - Customer Support, Trainee Engr., Hardware Engr. or Consultant; $59,467/yr, 40 hrs/wk, 8a - 5p. Submit resume of C.V. to The Phila. Job Bank, 444 N. 3rd St. - 3rd Fl., Phila., PA 19123, J.O. #2028805

SOFTWARE ENGINEER: Ability to analyze, design, develop and support client/server based GUI epplications using Power Builder 5.0. Demonstrated ability in writing queries on Sybese and Oracle servers. Experience in database designing, using ER-Win case tool to develop deta flow diagrams (DFD). Working knowledge in writing triggers and stored procedures for database access in Sybase 10.0. The job dutles ere: enelysis of current procedures and problems to refine and convert the data to programmable form; determine output requirements; study existing system to evaluate effectiveness; upgrade system presently in use; develop, test, end implement new softwere; correct systems/programs as necessary. Requires Bachelors in Computer Science with two years experience in software development. 40 hours per week et $45,000 per year. Pleese send resume to Cese # 19982831, PO Box # 8968, Boston, MA 02114.

Senior Systems Analyst to perform complex and critical systems enalysis tasks on SAP (Systems, Applications and Products in Data Processing) systems including R/3 Basis Production, planning, including installation, implementation, trouble shooting, resolving technical problems, working out software modifications to suit client requirements at verious client locations; to maintain close liaison with SAP computer scientists and engineers to work-out software modifications using related computer hardware, and epplications software. Need Bachelors or equivalent in Computer Science or Electrical Engineering and two (2) years experience, including knowledge and experience in SAP systems including SAP R/3 Basis and related hardware and software applications. The qualified applicant can work from his/her home. Travel to client sites required. Salary is $90,000.00 per year. If qualified send two (2) resumes & and cover letter documenting minimum qualifications to: Job Order # 2000-032 P.O. Box 989, Concord, NH 03302-0989.

Senior Systems Analyst to perform complex and critical systems analysis tasks on SAP (Systems, Applications and Products in Data Processing) systems including R/3 Basis Production, planning, including installation, implementation, trouble shooting, resolving technical problems, working out software modifications to suit client requirements at various client locations; to maintain close liaison with SAP computer scientists and engineers to work out software modifications using related computer hardware and applications software. Need Bachelors or equivalent in Computer Science or Electrical Engineering and two (2) years experience, including knowledge and experience in SAP systems including SAP R/3 Basis and related hardware and software applications. The qualified applicant can work from his/her home. Travel to client sites required. Salary is $130,000.00 per year. If qualified send two (2) resumes and cover letter documenting minimum qualifications to: Job Order # 2000-031 P.O. Box 989, Concord, NH 03302-0989.

Senior Systems Analyst to perform complex and critical systems analysis tasks on SAP (Systems, Applications and Products in Data Processing) systems including R/3 Basis Production, planning, including installation, implementation, trouble shooting, resolving technical problems, working out software modifications to suit client requirements at various client locations; to maintain close liaison with SAP computer scientists and engineers to work out software modifications using related computer hardware and applications software. Need MBA and knowledge and experience in SAP systems including SAP R/3 Basis and related hardware and software applications. The qualified epplicant cen work from his/her home. Travel to client sites required. Salary is $60,000/year. If qualified send resume and cover letter documenting minimum qualifications to: Job Order # 2000-033 P.O. Box 989, Concord, NH 03302-0989

Senior Systems Analyst to perform complex and critical systems analysis tasks on SAP (Systems, Applications and Products in Data Processing) systems including R/3 Basis Production, planning, including installation, implementation, trouble shooting, resolving technical problems, working out software modifications to suit client requirements at various client locations; to maintain close liaison with SAP computer scientists end engineers to work out software modifications using related computer hardware end epplications software. Need Bachelors or equivalent in Computer Science or Electrical Engineering and two (2) yeers experience, including knowledge end experience in SAP systems including SAP R/3 Besis end related hardwere end software epplications. The qualified applicant can work from his/her home. Travel to client sites requlred. Salary is $150,000.00 per yeer. If qualified send two (2) resumes end cover letter documenting minimum qualifications to: Job Order # 2000-043 P.O. Box 999, Concord, NH 03302-0989.

Consultant - Sought by Florida consulting company to work in various locations throughout the U.S. Consult with clients to define needs or problems. Conduct studies & surveys to obtain data & analyze data to advise on or recommend solutions including installation of alternate methods or modification of exlsting systems. Development of object oriented technology. Development, programming & implementation of MIS applications. Development of software UNIX, Windows, C, C++, Visual C++, Corba and Orbix with Rumba methodology. Requires Bachelor's in Computer Science, Electrical or Electronic Eng., Mechanical Eng., Systems Eng., Mathematics or its foreign educational equivalent. Plus 2 yrs in the job offered or 2 yrs in a related occupation including Programmer Analyst, Systems Analyst or Software Eng. Related exp. must include design, development, programming, testing and implementation of software applications using Unix, C++, Visual C++, Corba and Orbix with Rumba methodology $48,000/ year, 40/hrs per week, 8:30 AM-5:30 P.M. Respond by resume to Dept. of Labor/Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302, Att: L.Knight, Re: JO FL #2020860.

Full time Senior Consultant to design Global Systems for Mobile Communications (GSM), Code Division Multiple Access (CDMA) and Frequency Hopping Multiple Access (FHMA) cellular systems and sites. Analyze performance of GSM, CDMA and FHMA cellular radio systems. Measure and verify cellular radio network operations. Plan system optimization and integration PCS technologies as well as maintain and monitor service quality through plot/data analysis, including field activities to gather data and ensure optimum system performance. Design cell site selection. Responsible for design and deployment to existing equipment and configuration of new cell sites. Design and operation of Digital Cellular Networks including determining link budgets and power and FCC/FAA preparation. Must have a Bachelor's degree in Computer Engineering, Electrical Engineering, Electronic Engineering or foreign degree equivalent. Must have two years of experience in the job offered or two years of experience in a position with same duties. Salary $75,000/yr. Send resumes to: Logica Aldiscon 3535 Travis Street, Suite 110 Dallas, Texas 75204 Attn: Sherri Anding.

Computer Analyst/Consultant (in Jacksonville, FL) Analyze user reqs, oper, procs. & probs to design, construct, & implement comp. system capabilities to improve prod. & workflow. Employ high-level design techs to design customized software for client when needed. Study existing info processing systems to eval. effectiveness & dev. new systems. Prep workflow charts, diagrams, technical reports & instruc'al manuals for the client server. Coord. w/sytems analysts & info systems professionals in dev'ing, testing, installing & modifying programs. Provide tech support to clients to resolve complex soft/hardware issues as they arise, using expertise which must incl. SYNON 2/E. AS/400, & RPG III/400 & W/C. Mey include IMS MVS, COBOL, DB2, CICS, VSAM, IPT/TSO/OBSYDIAN, CLIII/400, etc. B.S./B.A. or equivalent in computer studies. 2 years exp req'd. verif. refs (3). Must pass police background check & pass drug test. $40,000/yr salaried position, 40 hrs/wk; 8:00a.m. to 5:00p.m. Send resume to: DOL, Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302, Attn: B.H., RE: JOFL#2008716.

JOIN An Emerging Leader...

*Hexaware Technologies, Inc. is a high-growth multinational IT services firm. A Deloitte & Touche study identified Hexaware as one of the **500 fastest growing technology companies in the United States** and the **16th fastest growing IT company in New Jersey**. Hexaware is one of 36 companies worldwide to achieve the SEI CMM Level 4 - a high quality designation. We need software engineers/project leaders with a minimum of 4 years of overall experience and at least 1 year in the core skill areas listed.*

Java, JDK, Servlets, SWING, Websphere, Weblogic

▲

XML, DHTML, HTML, Frontpage, Coldfusion, Broadvision

▲

Unix, C, C++, Perl/CGI, Corba, EJB

▲

Visual Basic, ASP, ActiveX, COM, DCOM, MTS, MSS

▲

MQSeries, Tuxedo, VITRIA, NEON, MSMQ

▲

System level programming with Unix/NT internals, C, C++

In addition, experience in Finance and Insurance sectors is desirable.

Multiple positions open countrywide, should be willing to relocate. We offer an excellent compensation package and comprehensive benefits. If you have what it takes, please send your resume to: The Recruiter, Hexaware Technologies Inc. 5 Independence Way, Princeton, New Jersey 08540 Fax: 801-469-5908
E-mail: careers@hexaware.com

HEXAWARE TECHNOLOGIES, INC.

Software Engineer: Job Location: Mobile, AL. Duties: Design & implement printer drivers for Microsoft Windows Operating Systems. Implement maintain & manage imaging systems on SOL Server from existing data systems incl. Oracle and SyBase. Analyze software requirements & design & implement product specific components & enhancements to software. Maintain existing software & perform tests after implementation on printer drivers, scanner drivers & printer/capture systems to ensure specs. are met. Perform troubleshooting & correcting bugs in software systems. Design & develop embedded controller solutions for printing & multifunctional products. Requires; M.S. in Comp. or Info. Sci., Elec. Eng. or related field & 2 yrs. exp. in the job offered or 2 yrs. exp. as an Assoc. Software Eng. Exp., which may have been obtained concurrently, must incl, 2 yrs. exp. designing & implementing printer drivers for Microsoft Windows Operating Systems, EOE. 40 hrs./wk., 8:00 e.m. to 5:00 p.m. Salary: $60,000/yr. Send resume (no calls) to: Donald Parker, Alto Imaging Technologies, Inc., 820 S. University Blvd., Suite 4D, Mobile, AL 36609.

SOFTWARE ENGINEER: Demonstrated ability in design and development in client/server architecture using Oracle database and Oracle software development tools. Proven ability in analysis, design, and development of software projects involving GUI front-end tools like Powerbuilder 4.0, Forms 4.5, and Reports 2.5. Experience in design and development of software projects using UNIX operating systems and Windows and software developing languages like C and Pascal. The job duties are: analysis of current procedures and problems to refine and convert the data to programmable form; determine output requirements; study existing system to evaluate effectiveness; upgrade system presently in use; develop, test, and implement new software; correct systems/programs as necessary. Requires Bachelors in Computer Science with two years experience in software development. 40 hours per week at $50,000 per year. Please send resume to Case # 19982884, PO Box 8968, Boston, MA 02114.

Full-time Systems Analyst, Client/Server Development. Responsibilities include: design, develop and implement multi-tiered client/server, Internet/Intranet based, object-oriented applications using Visual Basic, C, C++, JAVA, Microsoft Transaction Server and COM/DCOM, ASP, Internet Information Server and Visual InterDev, OLAP, Powerbuilder foundation classes and UNIX; perform installation and tuning of Oracle and MS-SOL Servers; develop GUI applications using Powerbuilder 6.5; perform application and database tuning; perform backup and recovery of database, perform user acceptance tests and user training; perform trouble shooting for applications and serve as liaison between client and Director of Client/Server Applications Development. Must have Bachelor of Science degree or foreign equivalent in Computer Science or Computer Engineering or a related field; must be proficient in Visual Basic, C, C++, object-oriented applications, GUI tools, case tools, Oracle Server 7.3 or higher and UNIX. Must be willing to travel to client sites Monday-Friday. Salary Range: $61,381 - $75,000 per year. Must have proof of legal authority to work in the United States. If interested, submit resume to: Ms. L. Anne Keller, NIIT (USA), Inc., 1050 Crown Pointe Parkway, Suite 900, Atlanta, Georgia 30338.

Systems Engineer: Analyze customer's tech req, applications specs, projected computing needs to provide solutions using company software in support of sales activities for new &/or enhanced systems applying detailed tech knowledge of company products. Compare available competitive technologies, demonstrate how company software provides best operating/application solutions. Present strategic tech briefings including advanced product info to educate users/project benefits of customer's integrated total computing strategies w/ company products. Assist product dev to identify, meet marketplace needs. Job is in Fort Lauderdale, FL. Req: Bachelor's in Computer Science + 2 yrs exp or 2 yrs as Programmer Analyst &/or Software Development Engineer. $46,000/yr, 40 hrs/wk, 9am-5pm. Submit resume to: Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302-0869. ATTN: L. Knight. Re: JO# - FL 2022388.

Senior Software Engineer/Team Leader will be responsible for leading a team of software engineers in the design, development, support & enhancement of an integrated set of data warehouse marketing & marketing investment management applications in a 3-tier client/server architecture. Will be responsible for the entire product development life cycle. Will elso oversee the design, development, support & modification of the corresponding Plug-In Enabling Architecture & graphical user interfaces for this system. Will oversee this data warehouse applications development work using the following software technologies: Visuel C++, OLE (2.0)/ActiveX eutomation interfaces, & Microsoft COM/DCOM Integration, with ODBC connectivity to Relational databases. Requires a Bachelor of Science degree in Mathematics or Computer Science. or Engineering & five (5) years in job offered OR five (5) years experience developing software applications using C++ in e Windows environment, OR, in the alternative a Master of Science degree in Mathematics or Computer Science, or Engineering & three (3) years in job offered or three (3) years experience developing software applications using C++ in a Windows environment. Candidate must also possess demonstrated expertise in design & development of data warehouse applications in a three-tier client/server architecture; demonstrated expertise in design & development of enabling Plug-In architecture using Microsoft COM/DCOM OR OLE (2.0)/ActiveX technologies; & demonstrated expertise in graphical user interface design using VISUAL C++ OR ActiveX/OLE Controls. Salary: $80,000 yr; M-F 9:00-5:00 Send resumes to: Case Number 19982878, P.O. Box 8968, Boston, MA 02114. EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis.

Software Engineer: Responsible for designing/implementing a web based server, a user interface and various device drivers for LAN Switch products. Responsible for system administration which includes maintaining a workgroup LAN with PC's running Windows NT/NetWare and Unix machines. Hrs. 8:00 am - 5:00 pm; Salary $69,000 yr. Req MS Computer Engineering, Computer Science, Electrical Engineering or related field and 2 years exp. Resume must include Applicants Social Security number/Job Order number NC3010926 and DOT code 030.062-010. Respond to nearest Job Service office or submit resume to Job Service 1105 Briggs Avenue, Durham, NC 27703

Senior Technical Consultant (Chief Computer Programmer): Consult with customers as to their requirements and translate these requirements into specifications for a team of FLEXGEN programmers; convert project specifications into detailed instructions and logical steps for coding into language, using FLEXGEN Rapid Application Development Tools and the COBOL programming language; provide technical support on the FLEXGEN product to the sales team; and prcvide training in the FLEXGEN tools to customers and company staff. Req.: 8 yrs in job offered or 8 yrs in related occupation as technical consultant, support manager, MIS manager, or related or any suitable comb. of edu., training, & exp. Hrs: 8a-5p, M-F, $60K per yr. Send resume to Judy Stalnaker at Transoft, Inc. 2000 RiverEdge Pkwy., Ste 450, Atlanta, GA 30328 Reference No. GL001

Knowledge Technologies, Inc., a company committed to providing Knowledge-Based solutions to global manufacturing businesses, is looking for a Senior Software Engineer to build and enhance the company's new Knowledge-based products and integrate these with the company's existing products. Candidates should possess at least a Master's degree or equivalent in Computer Science or Engineering and industry experience or advanced educations in knowledge-based systems. If interested and qualified, please send resume to: Human Resources, Knowledge Technologies International, Inc., 10 Maguire Road, Suite 232, Lexington, MA 02421; or fax to: 781-676-2130. Applicants must have unrestricted authorization to work in the United States.

Systems & Network Analyst

Info technology consulting firm seeks Systems & Network Analyst with the ability to analyze, design, develop & implement client server systems & networks using WIN NT, SCO UNIX. Exp with using hi end protocol analyzers. RAS (remote access network solutions), Internet/Intranet solutions & LAN/WAN technologies. Required 2 yrs exp and BS/BA degree. Send resume to:

Datavox Technologies
ATTN: Recruiting
2 Rector, NYC 10006,
Fax:212 301-4345 or Email:
recruiting@datvox.com

Software Engineer

Design software application systems in conjunction with auto electrical components development using VB6.0, Oracle and PLC. Develop Intranet-based projects for real time analysis using ASP. $40K+ Must have M.S. in C S. or in E.E. Please send resume to Dorothy Webster. Delphi Packard Electric Systems, 1001 Industrial Dr. Clinton, MS 39060. Ad paid by an equal opportunity employer.

SENIOR SOFTWARE ENGINEER to design, develop, test, implement, maintain and support application software in a Windows NT/95/98 environment using C++, Visual Basic, Java, VBScript, JavaScript, HTML, DHTML, XML, SQL, MTS, CICS and MSMQ while adhering to the software development standards and specifications of COM, CORBA and UML. Require: M.S. degree in Computer Science, or a closely related field, with 2 years of experience in the job offered or as a Systems/Programmer Analyst. Salary: $75,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Deron Streitenberger, Manager, Application Development, Republic Mortgage Insurance, 190 Oak Plaza Blvd., Winston-Salem, NC 27105; Attn: Job SD.

SENIOR SOFTWARE ENGINEER to design, develop, implement, maintain and support multiplatform and distributed (COM Technology) software solutions for finance and insurance industries using object oriented techniques and tools, including Centura, C++, Visual Basic, HTML, DHTML, Scripting and ASP. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field with two year of experience in the job offered or as a Software Consultant. Extensive travel required on assignment to various company and client sites within the U.S. Salary: $62,000/year; 8:30 am to 5:15 pm M-F. Send resume to: Elizabeth Haney, Assistant VP, Policy Management Systems Corporation, One P.M.S.C. Center (Int. Of I-77 & US 21N), Blythewood, SC 29016, Attn: Job SN.

Software Engineer. Design and develop object oriented technology, application software using tool/languages such as C, C++, Java, Unix. Network relational and database management systems GUI's. Work with SNMP to develop network management systems. BS (comp sci, rel field/equiv) and 5 yrs exp. (or 5 yrs exp as systems analyst/programmer). 40 hrs/wk. Send resume to: Hiring Manager Software Experts, Inc., 83 Second Avenue, Burlington, MA 01803.

Software Engineer. Design, develop and implement application systems in Windows environment. Develop software systems using Powerbuilder, Visual Basic, Sybase, Oracle, on LAN's under MS-Windows operating system. Design and implement software using C, C++, and analyze and determine user requirements. B.S. (comp sci, eng. rel field/equiv) and 5 yrs. exp. 40 hrs/wk. Send resume to: Human Resources, 128 Software, Inc., 44 Wood Avenue, Suite 1, Mansfield, MA 02048.

Software Engineer. Design, develop, implement and maintain client server and internet applications. Demonstrated ability working with languages such as C, C++, Java, and with Sybase database. Demonstrated ability working with tools such as JDK, Rational Rose for Java, Symantec Visual Cafe, iLog, Lotus Notes, Domino Web Server. Demonstrated ability working with multiple platforms such as Unix, Windows. $60,000/yr. 40 hr/wk. 9 a.m - 5 p.m. Must have 1 yr. exp. and M.S. Comp. Sci., Eng. rel. field/equiv. Send 2 copies of resume: Job Order #2000-023, P.O. Box 989, Concord, NH 03302-0989.

Medical Systems Programmer wanted by non-profit Health Care Organization in NYC. Req.: Computer Science, Medical Physics, Bioengineering or equiv. w/Bachelor of Science and 5 years exp. or Master of Science and 2 years exp. in design, development, and implementation of software systems for 3-dimensional medical imaging: used in radiation treatment planning & delivery. Send resume only w/cover letter to: ATTN: Kevina Grennon, Memorial Sloan-Kettering Cancer Center, 633 3rd Avenue, 5th fl., NYC 10017.

Manager/Technical Support & Dvlpmt needed by Research & Dvlpmt Co. in Boston, MA. Must have 2 yrs exp conducting research in TIPS & Its application to dvlp TIPS-oriented s/ware products. BS in Comp Sci or related field req'd. Respond by resume to: HR Dept, Invention Machine Corporation, 200 Portland St, Boston, MA 02114-1722.

Application Programmer needed by apparel mfg. BS in Comp Sci + 2yrs exp in C, SQL, UNIX shells, RDBMS client/server, Win 9x devel or support. VB a plus. Respond to HR Dept (AP), Maidenform, Inc. 154 Avenue E, Bayonne NJ 07002.

Systems Analyst sought by New Jersey based IS/IT Professional Consulting Services Firm for job locs throughout US. Must have Bach or equiv in any field & 2 yrs s/ware exp. Respond to: Personnel, Avenir, Inc., 16 Pearl St, Ste # 205, Metuchen, NJ 08040.

Software Engineer wanted by Computer Services Co. in Little Falls, NJ. Must have Masters in Comp Sci, Comp Engg or Elec Engg and 1 yr exp analyzing, dsgng & dvlpg MFG/PRO comp s/ware using PROGRESS 4GL. Respond by resume to: HR Dept, Integrated Systems and Services Group, Overlook Towers, 150 Clove Rd, Little Falls, NJ 07424.

Programmer/Analyst sought by Woodbridge, NJ Co. involved in S/ware Dvlpmt for Import & Distribution Industry. Must have Bach in C. S., Eng., or Math & 2 yrs exp dvlpg, modifying & testing business s/ware applics using Powerbuilder & Oracle. Respond to: HR Dept, Information Solutions, Inc, 10 Woodbridge Ctr Dr, Ste 630, Woodbridge, NJ 07095.

Credit Lyonnais seeks to fill the following position: Senior Systems Analyst-Must have MS in Comp Sci, Engg or equiv & 2 yrs Systems Analysis exp. Respond to: Lisa Ente, HR Dept, Credit Lyonnais NY Branch, 1301 Ave of the Americas, NY, NY 10019. Please mention job code CL001.

Systems Designer sought by Connecticut based Software Products & Services Co for job loc in Milford, MA. Must have Masters in Comp Sci & 1 yr s/ware exp. Respond to: Dustin Manozha, HR Dept, River Run Software Group, Inc., 9 Greenwich Office Park, Greenwich, CT 06831.

Software Engineer sought by Passenger Transportation Planning & Products Co in Cambridge, MA. Must have MS in Comp Sci & 1 yr s/ware exp. Respond to: HR Dept, Multisystems Inc., 10 Fawcett St, Cambridge, MA 02138.

Programmer/Analyst: Full-time openings to develop OO Systems in Client/Server environment using C++/VC++, Tuxedo, Pro*C, Oracle, Sybase on Unix/windows NT. Analysis & modeling using Rational Rose. TCP/IP programming using sockets & winsock. Scripting using Perl, Kshell. Use PVCS as version tracker. Also perform integration & system testing. Req. Bachelor's in Computer science/engineering, mathematics, electrical engineering, or other science or engineering field. Resume to: HR Manager, Omnisoft, Inc., 1265 Compass Pointe Crossing, Alpharetta, GA 30005.

3 positions for PROGRAMMER are available to create or modify computer programs, analyze workflow chart and diagram, applying knowledge of computer capabilities, subject matter, and symbolic logic, convert detailed logical flow chart to language processable by computer, analyze, review & rewrite programs to increase operating efficacy or to adapt program to new requirements. Must have MS or equivalent in CS, CIS, or MIS. Proficiency in Java, C++, and Oracle. $58,500/yr, 40 hr/wk, 8:00a.m.-5:00p.m. Contact Tina Spencer, Synergistic Solutions, Inc., 6100 Lake Forrest Drive, Ste. 285, Atlanta, GA 30328.

Applications Developer. Dsgn, dvlp, test & implmt systems using PowerBuilder w/Oracle/Sybase SQL. Qualified applicants must possess Masters in CS/Engg or related field & 2 yrs dvlpmt exp using PowerBuilder w/Oracle/Sybase SQL. Submit resume Brian Spence, Alliance Consulting Group Associates, 2005 Market St. Ste 3520, Phila PA 19103.

Software Engineer: Atlanta, Ga. Lead a technical team in analysis and design of airline business systems. Write technical specifications for system and provide technical support to the team. Convert system from MVS to Unix platform. Write code in Cobol, SQL (Teradata & Sybase), JCL, C++, in MVS and Unix environment. Master's Degree in Comp. Sci, Math, Engineering, Computer Applications or equiv. Plus 3 mos. Exp in the job offered. Competitive salary. 40 hr/wk. Mon-Fri, 9AM-5PM. Send letter/resume: BK#3, TELTECH 3295 River Exchange Dr., Suite 360, Norcross, Ga 30092.

Systems Analyst, Boston, MA; Design, develop and administer networked SUN workstation running SunOS and Solaris using Network Integration System (NIS), network File System (NFS) and ISDN for the financial and trading industry. Provide technical support. Req.d Bachelors in Engg. or Comp.Scie. or Math. 1 yr exp in job offered. 40 hrs/wk, 9:00am-6:00pm, $72,000/yr. Submit two (2) copies of resume in response to: Case #19982907, P O Box 8968, Boston, MA 02114.

Sftwr Dev'per: Dsgn, dev'p, implem't & enhance custom comp. Sftwr appl'n sys. w/Oracle 7.5, PowerBuilder 5.0, PowerTool on Unix; Dev'p multiplatform FTP download sys. coping w/ new program'g language ver'n; Analyze clients sftwr req't & modify/migrate exist'g sys. from 3d generat'n language to 4th w/GUI envir'mt; Train client GUI applic'n & Oracle DB. 40h/w, 8-5,$74k/y, MS in Comp./Sys. Eng'g, 1 yr exp. in the job or in any GUI sftwr posi'n req'ed. Resume to Bureau Wrkfc Sup't, PO Box 10869, Tallahassee, FL 32302 Re: Job#FL-2024859

Full time Software Engineer to design and develop IBM PC compatible system using assembly language. Develop PC diagnostic utilities in C and assembly language. Must have a Bachelor's degree in Electronics, Electronic Engineering, Computer Engineering or foreign degree equivalent. Must have one year of experience in the job offered or one year of experience in a position with same duties. Salary $65,000/yr. Send Resumes: American Megatrends, Inc. 6145-F Northbelt Parkway, Norcross, Georgia 30071. Attn: Nanda Chheda.

Systems Analyst

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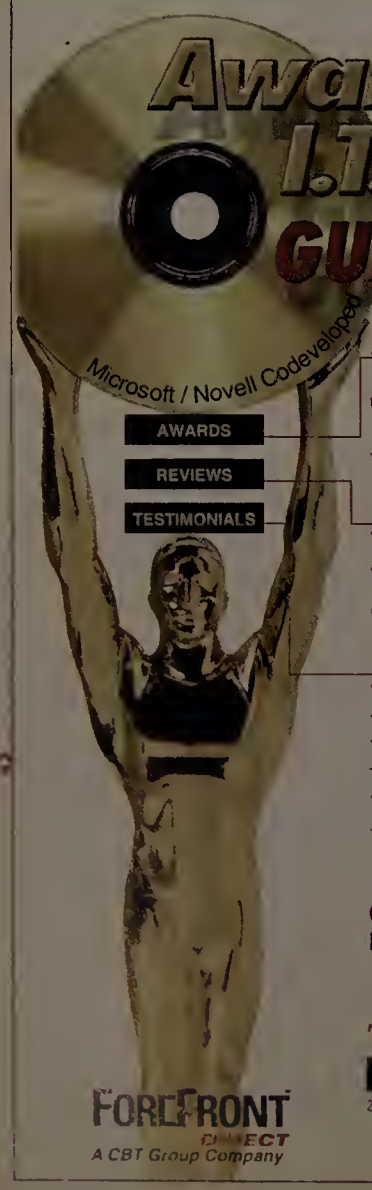

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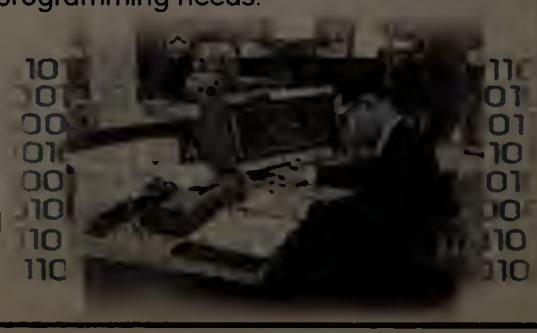

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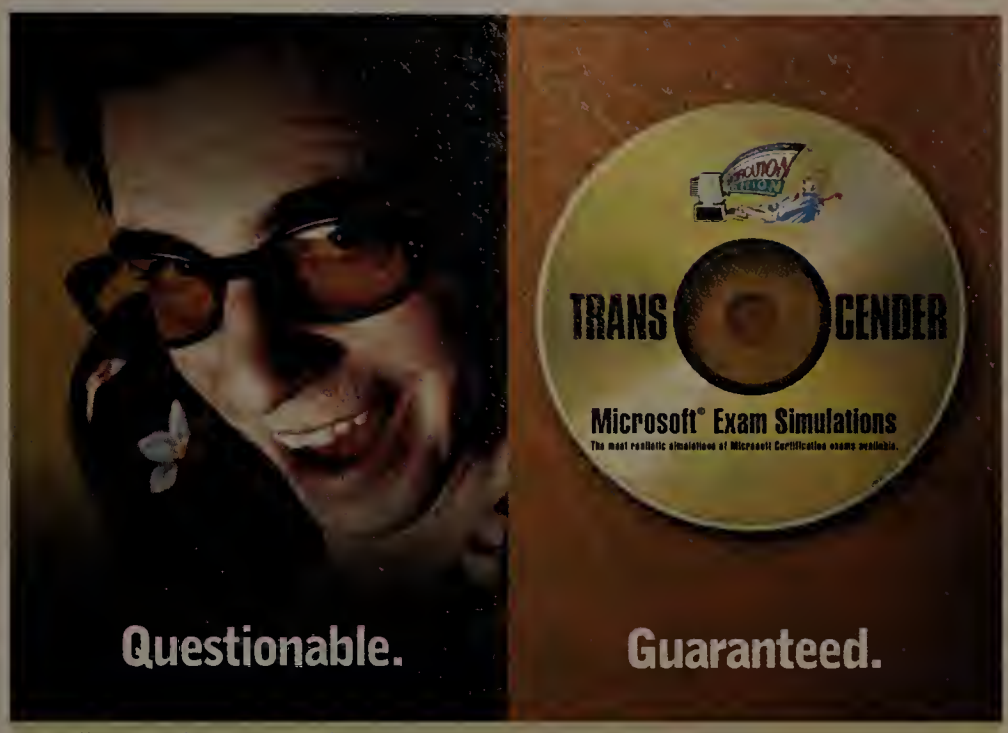

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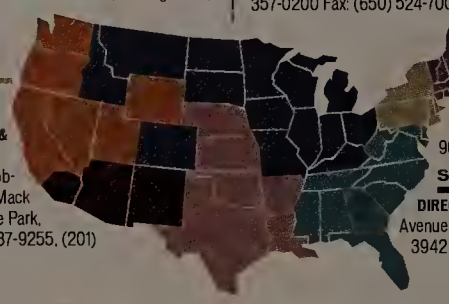

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CBT Group PLC (H)	40.7
Yahoo Inc. (H)	37.3
Red Hat Software Inc. (H)	36.0
Secure Computing Corp.	35.6

DOLLAR

Yahoo Inc. (H)	94.88
Red Hat Software Inc. (H)	74.19
Juniper Networks Inc. (H)	45.00
Tibco Software Inc. (H)	43.25
Safegard Scientifics (H)	35.75
Checkpoint Software Tech. (H)	34.56
Ariba Inc. (H)	26.75
Businesss Objects S.A. (H)	24.19

LOSERS

PERCENT

Auspex Systems	-18.9
eToys Inc.	-18.7
Altera	-17.2
Antec	-17.1
Procom Tech Inc. (H)	-17.1
Adaptec Inc.	-16.5
Synopsis (H)	-16.1

DOLLAR

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Apple Computer Inc. (H)	-13.00
Synopsis (H)	-11.94
Telephone and Data Systems (H).	-11.38
Xilinx (H)	-10.81
eToys Inc.	-10.50
Altera	-10.38
Adaptec	-9.31

AT&T to Cash in On Wireless Craze

Analysts praise strong wireless 'fundamentals'

BY DOMINIQUE DECKMYN

INDUSTRY ALMANAC

WITH RECENT reports suggesting that wireless phone usage will grow explosively for years to come, investors are buying up wireless stock, sending prices soaring. A soon-to-be-launched AT&T Corp. wireless tracking stock will give investors one more opportunity to buy into the craze.

AT&T [NYSE:T] last week announced its widely expected plan to create the AT&T Wireless Group, launch a tracking stock and sell about 20% of the new company to the public in an initial public offering expected to raise $10 million to $12 million.

Anticipation of the announcement had already boosted AT&T stock in late November, after a disappointing year. While AT&T has done well in wireless markets and is considered an innovator with its One Rate pricing program, its stock performance has been less than stellar. The stock experienced a drop earlier this year.

"What [the tracking stock] does do is create a currency in a market where concentration is expected to continue," says Robert Wilkes, an analyst at Brown Brothers Harriman & Co. in New York.

Salomon Smith Barney Holdings Inc. recently upgraded AT&T's stock from Neutral to Buy but made it clear that the expected launch of a tracking stock didn't influence this decision.

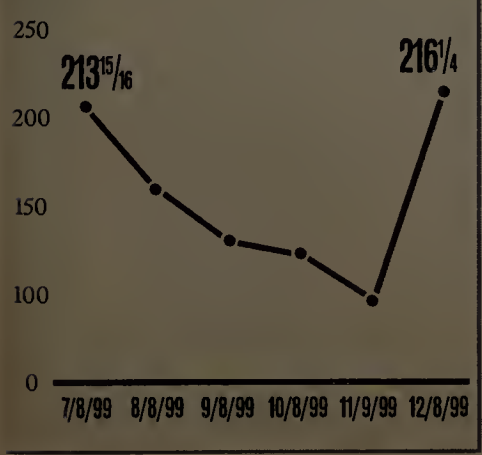
"We look at fundamentals, not financial engineering," says a Salomon Smith Barney report. The New York firm values AT&T's wireless assets at between $45 billion and $50 billion and sees the division's revenue growing 32.9% per year from this year to 2001. AT&T's nonwireless revenue will grow at a more modest 15.1% annual rate, Salomon Smith Barney predicts.

Lately, investors are enamored of all things wireless, whether it's carriers, handset vendors or infrastructure. Driving the market is the influx of new wireless users. They're substituting wireless calls for traditional voice calls and increasingly will use the wireless network for data calls, says Wilkes.

There are about 80 million wireless subscribers in the U.S. today, according to estimates from Becky Diercks, director of wireless research at Cahners In-Stat Group in Newton, Mass. By 2003, there will be 146 million.

Going Haywire

AT&T's stock during the past five months:



EXCH	52-WEEK		RANGE	DEC. 10 2 PM	WK NET CHANGE	WK PCT CHANGE
SOFTWARE UP 7.1%						
ASWX	101.25	12.50	Active Software (H)	86.50	10.88	14.4
ADBE	79.00	18.37	Adobe Systems Inc.	62.31	-6.50	-9.4
ARBA	246.00	61.00	Ariba Inc. (H)	234.00	26.75	12.9
AZPN	28.62	8.12	Aspen Technology Inc. (H)	27.75	3.81	15.9
AOSK	49.43	17.00	Autodesk Inc.	32.50	0.13	0.4
AVID	34.25	9.43	Avid Technology	10.75	-0.44	-3.9
BMCS	84.06	30.00	BMC Software Inc.	69.00	-5.69	-7.6
BOBJ	136.00	16.37	Businesss Objects S.A. (H)	124.00	24.19	24.2
CDN	34.06	9.12	Cadence Design Systems	18.19	-1.50	-7.6
CBTSY	38.25	8.56	CBT Group Plc. (H)	35.00	10.13	40.7
CHKP	208.21	23.00	Checkpoint Software Techn. (H)	198.06	34.58	21.1
CTXS	122.00	26.50	Citrix Systems Inc. (H)	106.75	6.69	6.7
COGN	41.50	17.12	Cognos Inc. (H)	40.13	4.63	13.0
CA	69.68	32.12	Computer Associates Int. Inc. (H)	62.06	-6.00	-8.8
CPWR	40.00	16.37	Compuware Corp.	34.81	-0.31	-0.9
OCTM	54.12	9.37	Documentum	44.75	0.00	0.0
EFII	64.87	30.25	Electronics For Imaging	50.75	3.81	8.1
HNC5	99.18	13.75	Hnc Software (H)	87.50	0.00	0.0
HY5L	33.75	9.87	Hyperion Software	30.13	3.13	11.6
IOXC	50.75	12.43	IOX Systems	30.06	6.31	26.6
INFA	107.68	19.00	Informatica Corp. (H)	105.00	17.50	20.0
IFMX	14.00	6.03	Informix Software Inc.	9.44	0.34	3.8
INTU	63.00	20.50	Intuit (H)	57.00	-2.69	-4.5
JKHY	52.00	26.43	Jack Henry Associates	47.44	4.31	10.0
JDEC	33.25	10.87	J.D. Edwards & Co.	27.06	-3.19	-10.5
LGTO	79.50	15.06	Legato Systems Inc.	72.25	3.00	4.3
MACR	87.50	26.25	Macromedia Inc. (H)	81.50	7.38	9.9
MANU	22.50	5.25	Manugistics Group Inc. (H)	18.69	-0.31	-1.6
MENT	15.06	7.50	Mentor Graphics	11.88	1.88	18.8
MSFT	100.75	63.87	Microsoft Corp.	92.88	-3.31	-3.4
NETA	67.68	10.06	Network Associates	27.13	1.88	7.4
GMH	97.62	33.62	Network General (H)	92.25	4.25	4.8
NOVL	31.18	16.06	Novell Inc.	21.00	-0.13	-0.6
ORCL	81.81	21.00	Oracle Corp. (H)	79.81	0.44	0.6
PMTC	30.37	11.68	Parametric Technology Corp. (H)	29.13	-0.31	-1.1
PSFT	26.37	11.50	PeopleSoft Inc.	18.81	-1.75	-8.5
PIXR	50.62	33.00	Pixar	39.75	-1.06	-2.6
RATL	53.68	21.87	Rational Software Corp. (H)	47.25	-5.38	-10.2
RHAT	302.62	40.00	Red Hat Software Inc. (H)	280.00	74.19	36.0
QSFT	120.00	20.50	Quest Software (H)	109.38	17.88	19.5
SAP	46.00	23.75	SAP AG	46.00	8.81	23.7
SCUR	29.00	2.25	Secure Computing Corp.	12.38	3.25	35.6
SE	46.43	17.93	Sterling Commerce Inc.	33.88	6.63	24.3
SSW	28.68	18.12	Sterling Software Inc. (H)	28.00	0.56	2.1
SDRC	23.43	8.81	Structural Dynamics Research	10.50	-0.75	-6.7
SYBS	19.81	5.31	Sybase Inc. (H)	17.69	-0.63	-3.4
SYMC	69.31	12.50	Symantec Corp. (H)	59.94	9.31	18.4
SNPS	75.62	37.12	Synopsis (H)	62.44	-11.94	-16.1
SCTC	21.50	7.81	Systems & Computer Technology	16.94	3.75	28.4
BAANF	17.81	6.87	The Baan Co. N.V.	13.31	-0.06	-0.5
VNTV	18.25	6.00	The Vantive Corp.	15.25	-1.50	-9.0
TIBX	149.93	19.75	Tibco Software Inc. (H)	149.00	43.25	40.9
TSAI	51.00	24.18	Trans. Sys. Arch.	34.13	-1.63	-4.5
VRTS	116.00	17.62	Veritas Software Corp. (H)	107.75	0.88	0.8
WIND	45.00	11.25	Wind River Systems Inc. (H)	41.75	5.81	16.2
TELECOMMUNICATIONS CARRIERS UP 0.5%						
AT	91.81	53.18	Alltel Corp. (H)	89.44	1.50	1.7
ANDW	22.87	11.00	Andrew Corp.	13.38	-0.50	-3.6
T	64.12	41.50	AT&T	57.44	0.38	0.7
BCE	76.68	33.81	BCE Inc. (H)	76.06	2.81	3.8
BEL	69.50	50.62	Bell Atlantic	63.50	-2.56	-3.9
BLS	51.37	39.75	Bell South	47.06	-0.56	-1.2
BRW	33.18	13.00	Cincinnati Bell Inc. (H)	29.94	-1.94	-6.1
CMCSK	52.31	26.12	Comcast (H)	50.00	4.06	8.8
CQ	39.00	15.37	Comsat Corp.	18.31	-0.31	-1.7
COX	49.25	28.50	Cox Communications Inc. (H)	48.63	0.75	1.6
GSTRF	33.00	12.62	Globalstar Telecom. Ltd.	22.56	1.94	9.4
GTE	78.50	57.00	GTE Corp.	72.81	-3.56	-4.7
NXTL	117.37	19.93	Nextel Communications	102.81	-4.19	-3.9
SPOT	51.25	26.37	Panamsat	45.56	0.56	1.3
QCOM	407.50	24.50	Qualcomm (H)	389.75	2.75	0.7
SBC	59.93	44.06	SBC Communications	53.81	0.00	0.0
FON	75.93	36.87	Sprint Corp.	68.69	-0.31	-0.5
TOS	137.00	40.87	Telephone and Data Systems (H)	124.00	-11.38	-8.4
USW	67.00	51.50	US West (H)	66.81	3.00	4.7
VIA	56.43	32.00	Viacom (H)	55.06	2.19	4.1
WCII	64.43	28.50	Winstar Communications Inc.	61.38	6.75	12.4
WCOM	96.75	61.12	MCI Worldcom Inc.	77.25	-3.88	-4.8
SERVICES UP 6.5%						
ACXM	31.25	14.56	Acxiom Corp.	18.19	0.81	4.7
ACS	53.00	31.75	Affiliated Computer Servs	36.19	-1.63	-4.3
AMSY	40.25	19.75	American Mgt. Systems	34.44	0.69	2.0
AUD	52.00	36.25	Automatic Data Processing (H)	50.19	-1.19	-2.3
BSYS	62.00	41.37	Bisys Group Inc.	59.00	0.63	1.1
CATP	32.25	10.62	Cambridge Technology Ptnrs	24.25	8.19	51.0
CEN	40.50	16.62	Ceridian	20.31	-0.88	-4.1
CBR	29.56	13.75	Ciber Inc.	27.00	3.25	13.7
COD	30.87	10.75	Comdisco	26.88	1.13	4.4
CHRZ	30.00	9.25	Computer Horizons Corp.	18.31	4.63	33.8
CSC	75.25	52.37	Computer Sciences (H)	74.94	4.31	8.1
OST	70.25	50.93	Ost Systems Inc.	64.00	-0.88	-1.3
EDS	70.00	40.43	Electronic Data Systems (H)	67.06	-1.56	-2.3
FDC	51.50	24.56	First Data Group	44.19	0.13	0.3
FISV	40.75	24.12	Fiserv	35.38	-1.63	-4.4
IT	25.75	9.56	Gartner Group	13.00	0.44	3.5
KEA	43.62	17.25	Keane	28.38	2.88	11.3
NDC	55.25	21.75	National Data	32.94	-0.19	-0.6
PAYX	44.87	23.56	Paychex Inc.	40.44	-2.19	-5.1
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SMS	73.50	35.50	Shared Medical Systems	48.44	-0.31	-0.6
SOS	41.93	16.87	Sungard Data Systems	22.56	-0.83	-2.7
SYNT	16.93	7.00	Syntel Inc. (H)	15.94	2.81	21.4
TECD	44.68	14.50	Tech Data	22.50	-2.06	-8.4
TENF	41.00	17.00	TenFold Corp.	29.88	-0.13	-0.4
TSS	26.25	14.12	Total System Services Inc	16.19	0.31	2.0
TSAI	51.00	24.18	Transaction Sys. Architects	34.13	-1.63	-4.5
NETWORK UP 7.5%						
COMS	51.12	20.00	3Com Corp.	43.06	2.25	5.5
ADCT	69.75	26.31	ADC Telecommunications Inc. (H)	64.75	-2.94	-4.3
ANTC	60.25	15.62	Antec	42.63	8.81	17.1
BNYN	19.37	6.25	Banyan Systems Inc.	15.88	1.44	10.0
CS	25.25	7.18	Cabletron Systems	23.56	0.94	4.1
CNEBF	9.75	3.50	Call-Net Enterprises (L)	3.81	0.00	0.0
CSCO	103.00	39.31	Cisco Systems Inc. (H)	98.25	2.19	2.3
ECIL	45.00	23.75	ECI Telecom	24.88	-0.13	-0.5
ENTU	70.37	16.87	Entrust Technologies Inc (H)	56.94	18.89	48.9
HRS	40.62	18.25	Harris Corp	23.13	0.88	3.9
GMH	97.62	33.82	Hughes Electronics/GM (H)	92.25	4.25	4.8
ERICY	66.56	20.50	LM Ericsson (H)	58.38	3.31	6.0

EXCH	52-WEEK		RANGE	DEC. 10 2 PM	WK NET CHANGE	WK PCT CHANGE
JNPR	375.50	90.12	Juniper Networks Inc. (H)	351.00	45.00	14.7
LU	84.18	46.56	Lucent Technologies (H)	81.63	0.50	0.8
MADGF	5.00	1.43	Madge Networks (H)	4.47	1.72	62.5
NCDI	8.00	3.87	Network Computing Dev	6.19	0.25	4.2
NWK	14.81	7.31	Network Equipment Tech (H)	14.38	2.19	17.9
NN	39.87	14.00	Newbridge Networks	24.19	1.50	6.6
NOK	179.12	52.31	Nokia Corp. (H)	166.00	11.06	7.1
NT	87.50	22.06	Northern Telecom Ltd (H)	87.50	6.38	7.9
PAIR	18.56	6.87	Pairgain Technologies Inc.	14.25	-0.94	-6.2
PCTL	11.00	3.25	Picturetel	5.25	0.50	10.5
SFA	66.50	19.43	Scientific Atlanta (H)	59.88	-0.69	-1.1
TLAB	77.25	31.56	Tellabs Inc	62.06	-6.25	-9.1
USW	87.00	51.50	US West (H)	66.81	3.00	4.7
VRLK	5.19	1.81	Verilink	4.63	0.56	13.8
WSTL	12.37	3.81	Westell Technology Inc (H)	10.50	0.50	5.0
SEMICONDUCTORS CHIPS & EQUIPMENT OFF -4.8%						
ADPT	57.75	16.68	Adaptec	47.19	-9.31	-16.5
AMD	33.00	14.56	Advanced Micro Devices	28.63	2.50	8.0
ALTR	68.56	23.93	Altera	49.88	10.38	17.2
ADI	76.75	24.31	Analog Devices (H)	66.50	-3.06	-4.4
AMAT	115.37	39.12	Applied Materials (H)	108.44	-1.81	-1.6
ASML	109.62	26.43	ASM Lithography Holding (H)	96.00	-3.75	-3.8
FCS	34.12	18.50	Fairchild Semiconductor Corp. (H)	31.63	-0.38	-1.2
HRS	40.62	18.25	Harris Corp	23.13	0.88	3.9
INTC	89.50	50.12	Intel Corp.	72.00	-7.81	-9.8
KLAC	105.25	37.43	Kla Instruments (H)	91.00	-6.00	-6.2
LLTC	83.18	36.81	Linear Technology (H)	72.00	-8.50	-10.6
LSI	71.37	15.31	LSI Logic (H)	60.00	-4.81	-7.4
MXIM	95.87	37.62	Maxim Integrated Products (H)	87.38	-4.19	-4.6
MU	85.00	34.25	Micron Technology	61.00	-7.69	-11.2
MOT	136.43	55.25	Motorola (H)	129.63	4.88	3.9
NSM	51.87	8.87	National Semiconductor (H)	49.06	2.25	4.8
STM	145.00	35.68	SGS-Thomson Microtronics (H)	137.00	3.69	2.8
SLR	98.00	33.93	Solectron Corp. (H)	90.50	-2.13	-2.3
TER	56.00	18.50	Teradyne (H)	48.19	-2.00	-4.0
TXN	111.50	38.37	Texas Instruments (H)	105.75	2.69	2.6
JOSU	273.62	27.68	Uniphase	242.13	-7.63	-3.1
VTSS	55.37	19.87	Vitesse Semiconductor Corp	48.50	-2.75	-5.4
XLNX	97.12	27.31	Xilinx (H)	83.13	-10.81	-11.5
COMPUTER SYSTEMS OFF -0.9%						
AAPL	118.00	31.62	Apple Computer Inc. (H)	100.69	-13.00	-11.4
ASPX	15.25	2.75	Auspex Systems	10.75	-2.50	-18.9
BEOS	18.68	3.28	Be Inc.	15.63	1.75	12.6
CPQ	51.25	18.00	Compaq Computer Corp.	24.94	-0.94	-3.6
DELL	55.00	31.37	Dell Computer Corp.	41.31	-3.94	-8.7
GTW	84.00	24.62	Gateway 2000 Inc.	68.25	-5.19	-7.1
HWP	118.43	62.87	Hewlett-Packard Co.	108.75	3.00	2.8
HIT	147.50	57.75	Hitachi Ltd.	136.00	-6.81	-4.8
IBM	139.18	80.87	IBM	109.56	-2.38	-2.1
MUEI	22.62	9.00	Micron	10.31	-1.25	-10.8
MOT	136.43	55.25	Motorola (H)	129.63	4.88	3.9
NATI	35.43	17.18	National Instruments Corp	32.63	2.50	8.3
NCR	55.75	26.68	NCR	32.44	-0.56	-1.7
NIPNY	125.00	42.62	NEC	110.75	-4.00	-3.5
PRCM	38.25	3.43	Procom Tech Inc. (H)	28.13	-5.81	-17.1
SGI	20.87	6.87	Silicon Graphics Inc.	11.88	1.88	18.8
SNE	192.00	65.50	Sony	187.00	4.75	2.6
SUNW	83.03	18.12	Sun Microsystems Inc. (H)	81.06	10.34	14.6
TRCD	7.25	1.50	Tricord Systems	4.94	0.00	0.0
UIS	49.68	20.93	Unisys Corp.	34.31	2.63	8.3
INTERNET UP 5.1%						
AMZN	113.00	33.68	Amazon.com (H)	106.88	16.63	18.4
AOL	89.50	22.00	America Online	89.50	8.00	9.8
ATHM	99.00	30.87	@home Corp.	45.63	-7.44	-14.0
BAMB	27.75	8.93	Bamboo.com	13.50	-0.63	-4.4
CKFR	84.75	16.56	Checkfree (H)	80.50	5.19	6.9
CYCH	24.00	6.68	Cybercash Inc.	10.31	0.25	2.5
EBAY	234.00	55.37	eBay Inc.	162.88	-16.19	-9.0
ETYS	86.00	28.12	eToys Inc.	45.69	-10.50	-18.7
EGRP	72.25	6.50	ETrade Group Inc.	34.69	3.19	10.1
LCOS	92.62	25.56	Lycos Inc. (H)	85.88	21.50	33.4
OMKT	49.84	11.18	Open Market Inc. (H)	44.50	3.13	7.6
OTEX	42.50	9.50	Open Text Corp.	17.50	-0.88	-4.8
PCLN	165.00	50.50	Priceline.com Inc.	58.63	-5.19	-8.1
PRGY	50.62	14.00	Prodigy Communications	24.38	-2.44	-9.1
PSIX	73.75	16.50	PSINet Inc.	66.88	10.38	18.4
RSAS	43.37	14.25	Security Dynamics	40.88	2.88	7.6
SPYG	33.75	8.62	Spyglass Inc.	23.94	-0.19	-0.8
WINK	55.25	21.75	Wink Communications Inc.	48.50	6.25	14.8
YHOO	353.00	94.31	Yahoo Inc. (H)	349.13	94.88	37.3
STORAGE & PERIPHERALS OFF -2.2%						
AQPT	57.75	16.68	Adaptec Inc.	47.19	-9.31	-16.5
APCC	27.75	13.12	American Power Conversion	23.63	-1.00	-4.1
CANNY	38.00	19.25	Canon Inc. (H)	36.00	3.75	11.6
DBD	39.87	20.75	Diebold Inc.	21.00	-1.38	-8.1
EK	80.37	60.06	Eastmen Kodak Co (L)	61.06	0.69	1.1
EMC	97.82	38.93	EMC (H)	95.81	-0.19	-0.2
IOM	10.18	2.87	Iomega	3.94	0.25	6.8
MXTR	21.25	4.25	Maxtor Corp.	5.44	0.56	9.4
NTAP	159.12	33.68	Network Applinace Inc. (H)	151.50	10.50	7.4
LXK	104.00	40.87	Lexmark International Group Nc	76.25	2.94	3.7
SEG	44.25	25.12	Seagate Technology	38.44	1.88	4.7
STK	41.62	14.25	Storage Technology	18.31	-1.69	-8.4
TEK	39.56	17.56	Tektronix (H)	38.63	0.69	1.8
XRX	63.93	22.75	Xerox	24.76	-1.81	-6.8

KEY: **(H)** = New annual high reached in period
(L) = New annual low reached in period

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Users Want Vendors To Support New Java

Confusion over branding, testing program

BY CAROL SLIWA
NEW YORK

CORPORATE users said they want vendors to support the Java 2 Enterprise Edition (J2EE) development platform that Sun Microsystems Inc. launched at last week's Java Business Conference.

But IBM — one of the biggest Java backers — and some others expressed confusion about the J2EE branding program, as well as compatibility tests that must be conducted to give users certainty that their applications will run on different platforms.

On Wednesday, a Sun official said that only eight vendors had licensed J2EE, although Sun claimed that 54 companies had "endorsed" it.

"We're major licensees. We shouldn't be confused," said Rod Smith, IBM's vice president of Java.

It's difficult and time-consuming to test a Java application in the comprehensive, front-end-to-back-end way Sun has proposed, given the myriad product configurations and combinations that could be used, IBM officials said.

In the end, a customer would know only that the product passed the test for a specific configuration. Smith said testing in that sort of holistic way threatens Java's value because part of the development platform's appeal is its flexibility for integration in mixed environments.

Arny Epstein, chief technology officer at SilverStream Software Inc. in Burlington, Mass., raised a different issue with Sun. Epstein said that the nine individual J2EE specifications are being updated at different times. "To take a snapshot in time and say you're compliant with these specs doesn't make sense, because I'll lose compliance if I upgrade to Servlet [Version] 2.2 in three months but J2EE [Version] 1.1 hasn't come out," Epstein said.

BEA Systems Inc. in San Francisco said it will comprehensively support J2EE, but only in its high-end enterprise application server. " 'One size fits all' is a concern with the current branding model as it's proposed," said Scott Dietzen, BEA's chief technology officer, but he added that he doesn't consider it to be a major issue.

Regardless, Sun product line manager Bill Roth said Sun is working to resolve all such issues — which should come as welcome news to customers.

"It's important for us to know that vendors have kept up with the latest specs," said Stephen Bergeron, an e-commerce consultant at Cigna Corp.'s systems division in Hartford, Conn. He added that he would like to see vendors test J2EE "as a suite," as opposed to individual pieces of technology, "because that's how we put applications together. And it gives us some baseline to look at one vendor against another."

Branding is very important in the long run to Theodore Pearson, a systems analyst at Chicago Stock Exchange Inc. "It gives us much greater flexibility [to switch products], in addition to the assurance that things will work effectively the first time out," Pearson said.

IBM, for one, has no plans to brand its products with the "Java Compatible Enterprise Edition" logo that Sun unveiled last week, officials said. ◗

Sun: No Fees

Sun last week announced that it will no longer charge fees or royalties to licensees of the standard version of its Java technology beginning Jan. 31.

The standard version includes the Java runtime, compiler and class libraries.

Other announcements that Sun made last week include:

- Plans to ship a Linux version of the Java 2 Standard Edition development platform.
- Formation of an expert group to oversee the development of Extensible Markup Language (XML) data-binding technology that will help developers translate XML documents into Java objects.
- A Java application programming interface (API) for reading, manipulating and generating XML data. Simplifying the process of plugging into an XML parser will reduce the amount of code developers need to write.
- The beta release of Forte for Java, Community Edition Version 1.0, a cross-platform Java development tool that is available as a free download (*www.netbeans.com/product_dl.html*) for the Solaris, Linux, Windows 98 and Windows NT platforms.
- New classes that will be available in January to help information technology organizations learn about the J2EE development platforms.

– Carol Sliwa

Continued from page 1

Java

Using the technology would be simpler if the language were a standard, said Joseph Rosario, president of Oakland, Calif.-based Skeva Technologies Inc., which developed an online customer application for Kaiser Permanente Health Plan Inc. "As a development company, we really can write to one code base" in a Java standards world, he said.

IBM Vice President Rod Smith said having standards for technologies like Java is vital to doing business on the Internet. "We've built all our e-business base around open standards. It's not just Java. It's XML. We believe very strongly that that's the way the Internet is going to evolve," Smith said.

At last week's Java Business Conference, Sun's recently appointed software division president, Patricia Sueltz, said she took responsibility for the decision to halt the standards effort, claiming that her company needs to make sure Java products are compatible with the reference implementations that prove the technology works.

"We will remain the guardians of Java compatibility. Sun has a covenant to keep with the 2 million Java developers and over 200 licensees, and we're steadfast about controlling compatibility but not controlling the technology," Sueltz said.

Sun's latest standards effort, through Geneva-based ECMA (formerly known as the European Computer Manufacturers Association), hit a snag in late October when the company declined to turn over what it said were hundreds of pages of Java documentation explaining the piece of the technology that would be standardized.

Although a wide range of companies are participating in developing Java in what is known as Sun's Java community process (JCP), some vendors with expertise in certain Java technologies have balked at signing agreements they say give Sun too much control.

Hewlett-Packard Co. has taken its own steps to evolve real-time Java, an area in which it has considerable expertise because of its work with printers and other devices that need the technology.

Such efforts have led to fears that Java will fragment.

Even IBM has reservations about JCP. "JCP isn't a substitute for an open-standards process," asserted Smith, whose company has participated extensively in the process. He added, "A single company with a JCP is in a control position for the process, and even in the short term, that's unacceptable."

But others said Java is so well accepted in the industry now that formal standardization isn't critical.

"It's already caught on, and the industry is taking care of Java," said Stephen Bergeron, an e-commerce consultant at Cigna Corp.'s Systems Division in Hartford, Conn. He added that Sun has done a good job shepherding the technology.

Sueltz, Smith's predecessor at IBM, said she will listen to IBM officials and act on some of their requests, although she declined to provide specifics.

IBM supports ECMA exploring a Java standard through publicly available documents without Sun's participation. ECMA's general assembly will meet Thursday to discuss the issue. A Sun official called the effort "misguided." He said that would apply to only 20% to 30% of the platform. ◗

Sun Microsystems' Java Standardization Efforts

Nov. 97 – Sun gains fast-track status to submit the Java language, virtual machine and class library specifications to the International Standards Organizations (ISO).

April 99 – Sun proclaims end to ISO standards effort, claiming that rules changes would give ISO technical committee power to evolve the Java technology.

May 99 – Sun announces plans to standardize Java through ECMA.

Oct. 99 – ECMA standards effort hits snag when Sun raises concerns about trademark, copyright and technology evolution issues.

Dec. 99 – Sun abandons ECMA standards effort.

SOURCE: SUN MICROSYSTEMS INC., MOUNTAIN VIEW, CALIF.

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FRANK HAYES/FRANKLY SPEAKING

Opportunity knocks

I WAS GOING TO WRITE SOMETHING this time about Microsoft and Sun Microsystems and their standards-group needle match. Last week, Sun pulled out of its most recent run at making Java a full-fledged official standard by way of a European standards organization called ECMA. It should have been a fast-tracked slam dunk, but Microsoft planted enough obstacles to delay approval for years — and maybe grab control of Java itself. Call that Microsoft's revenge, since back in 1995, Sun got ECMA to approve a reverse-engineered specification for Microsoft Windows as an official standard. It took a lawsuit threat from Microsoft to deep-six that one.

But let's face it — we don't care. Right now we're trying to save the world, or at least our little corner of it.

So if Sun and Microsoft want to pour time, effort and resources into playing dirty tricks on each other in standards groups we've never heard of, if they really think they can get an advantage that way — hey, who are they kidding? We're not going to buy products on the say-so of ECMA, or NIST, ANSI, IEEE, ISO or any other alphabet-soup standards organization. Windows and Java will succeed or fail based on how well they deliver what users want. The rest is just a sideshow.

Meanwhile, in less than three weeks, IT and end users will work together in our biggest joint effort ever: getting through the Y2K rollover. We've been grinding away toward this moment, all of us, for what seems like forever. Now it all comes down to how well we've done our jobs — and how well users do theirs.

Now it all comes down to how well we've done our jobs.

We'll be putting out fires; they'll be working around glitches. We'll be checking logs and sprinting to fix every failure; they'll be smoothing out the rough spots. We'll be unclogging network bottlenecks; they'll be stalling customers until the transactions go through.

For this one crisis, we *will* all pull together. For once, we'll all do exactly what we're supposed to: IT will give users its full and complete support, and together we'll fully and unreservedly support the needs of the business.

For a while, anyhow.

But you know what will happen. Maybe it'll take weeks, maybe only days. But some department head will decide her users can't live without certain products that don't fit the IT shop's big architectural plan. Or a vice president will read a business journal or in-flight magazine and decide we have to get into EDI or XML or PDQ. Or the CEO will get wined and dined at some billionaire's Xanadu and come back with a newfound love for Windows 2000.

Then the infighting will begin. The politicking and accusations. The sabotage and counter-sabotage. It'll get ugly. In the end, maybe we'll win that battle, maybe we'll lose. But one thing's certain: We'll remember why we hate those clueless dweebs, and they'll remember why they hate us nitwit nerds.

And things will go downhill from there. Users will find ways to take revenge for offenses real or imagined. We'll respond in kind. Pretty soon, we'll all be pouring time, effort and resources into needle matches of our own.

I could tell you it doesn't have to happen that way. But we all know it will.

So over the next few weeks, when you're canceling out of holiday parties because you've got to work another late night, when your New Year's champagne and caviar get swapped for Jolt cola and cold pizza, just remember this: Y2K may not only be the biggest IT crisis you've ever faced.

It may also be the only time you'll ever be able to do your job exactly right. ◗

Hayes, Computerworld's staff columnist, has covered IT for 20 years. His e-mail address is frank_hayes@computerworld.com.

SHARK TANK

SHARKY'S GRUBBY FINS hold a hush-hush SAP memo that says: "If you are currently running any R/3 4.X systems on Microsoft SQL Server" with certain attributes, you need a kernel patch. Some combinations, when run with active stored-procedures statistics, may "in rare cases" cause data errors "due to a malfunction of the SAP database interface." SAP says only a few customers were affected. If you're one of them, drop the Shark a line.

HOLIDAY HEARTWARMER A new manager ripped a big project away from the "amateurs" who'd done the previous versions. Oops – his hotshot team couldn't deliver decent code. Solution? He urged users to pour on new requirements. Yup, the old feature-creep stall. It worked for a year, but then the hotshot had to deliver. Resulting system was late, lousy and got him fired. Fa la la la la. La la la la.

SO THIS plumbing-supply outfit in Cleveland, Oatey Co., is bringing up a new frame-relay network. This month. Steve Gregory, Oatey's IT chief, figured the company was all set on Y2K, so "the techs will be sitting around with nothing else to do." Meanwhile, a pilot fish at a huge telco sends a frantic note: "We are soon to deliver a high-visibility product to our most important customer. We must be the only company in the whole world going live with a critical new system three days before the millennium!" Guess the boss figured you'd have nothing else to do.

SPEAKING OF Y2K Last week, this guy was running Y2K tests on what was supposed to be an isolated test-bed LAN. Made a time change. Hit Enter. Ten seconds later, everything shut down. *Everything.* Clients, servers, lights, power – the works. "The building just happened to suffer a complete power outage," the pilot fish laughs. The power came right back up – but the guy's hair is gray forever.

AND THEN THERE'S the South Carolina agency that has two big projects to outsource: Survey its entire IT environment, decide what info needs to be included on its new Web page and hire somebody to build that page. Punch line: Top brass insists that the latter project be done first. That's right: Outsource the Web site, *then* decide what goes on it. Result? All the potential Web consultants walk after a very short first meeting.

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The 5th Wave

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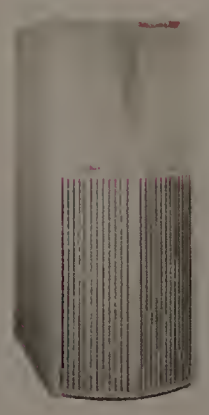

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